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Commercial Fisheries Abstracts

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service

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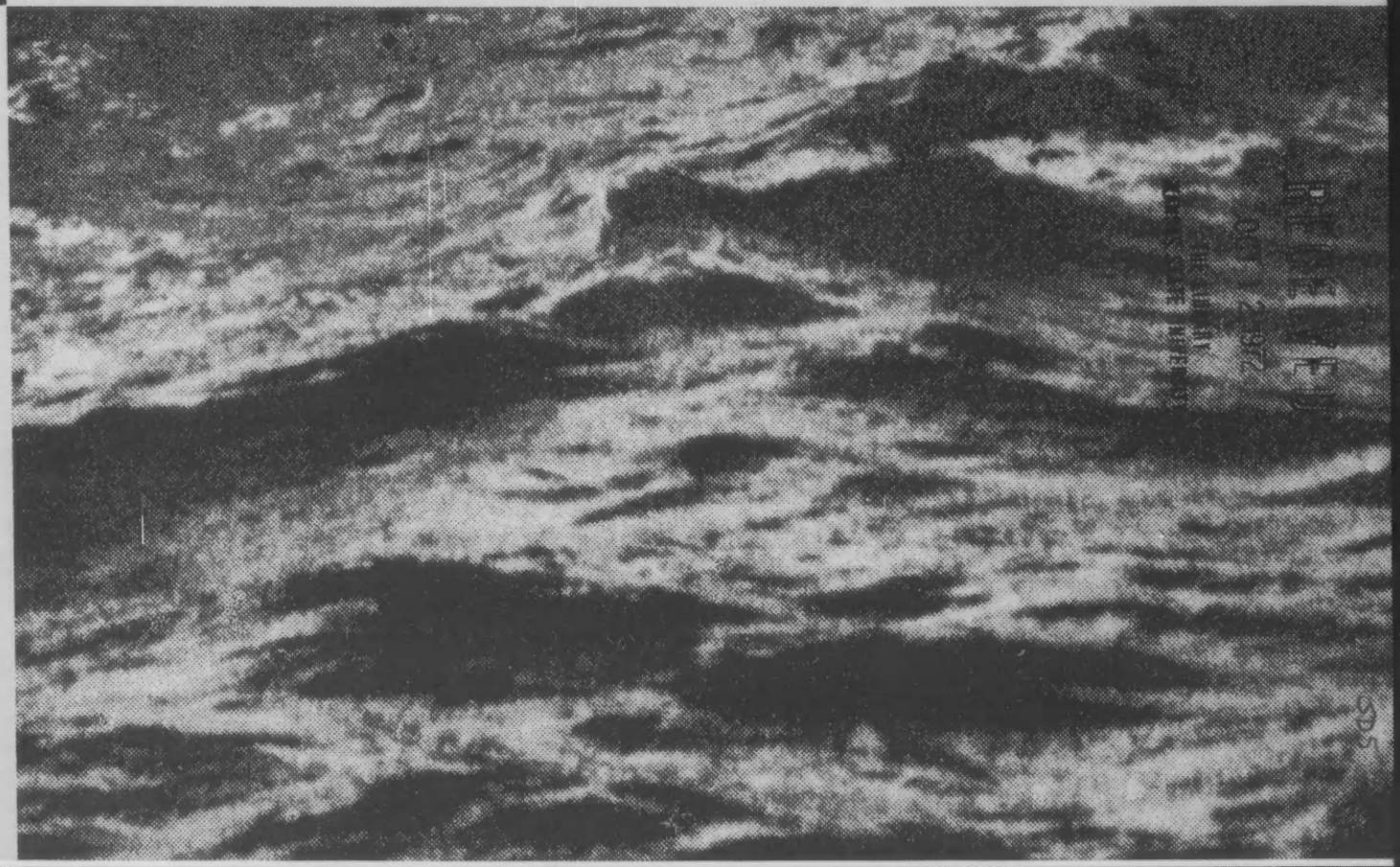

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UNITED STATES DEPARTMENT OF COMMERCE
Peter G. Peterson, *Secretary*

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
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NATIONAL MARINE FISHERIES SERVICE
Philip M. Roedel, *Director*

FOREWORD

The Department of Commerce's National Marine Fisheries Service publishes the monthly journal *Commercial Fisheries Abstracts* as one means of communicating to the fishing industry and allied groups the status of current fishery research. The research includes the biological aspects of fishery science as well as technological studies dealing with aquatic resource supply, harvesting, processing, utilization, and distribution.

Commercial Fisheries Abstracts contains summaries of selected articles from trade, engineering, and scientific journals dealing with the entire spectrum of fishery science. The publication is designed to serve the needs of fishery scientists, engineers, and managers in industry, academic institutions, and government by supplying timely information on current progress in fishery research and technology.

For sale by the Superintendent of Documents, U.S. Government Printing Office Washington, D C 20402 - Subscription price: $3.50 per year ($1.00 additional for foreign mailing). Cost per single issue - $0.35.

0.32 (8.51) STUDIES ON THE CONCENTRATION OF MYOGLOBIN IN THE SEA-COW AND PORPOISE

Blessing, M. H. (Institute of Pathology, University of Düsseldorf, Germany)
Comparative Biochemistry and Physiology 41, No. 3A, 475-480 (Mar. 1, 1972)

The skeletal muscle of the porpoise contained about 10 times more myoglobin than did that of the sea-cow. The myoglobin concentrations of the cardiac muscles of the two mammals were only slightly different. There appears to be a close relationship between the myoglobin concentration in the muscle and the habits of marine mammals. [1 figure, 2 tables, 16 references] FTP

0.321 (8.51) STUDIES ON ROASTING CHANGES OF PROTEINS. PART I. CHANGES OF CASEIN AND LYSOZYME DURING ROASTING

Fujimaki, Masao, Hiromichi Kato, and Fumitaka Hayase (Department of Agricultural Chemistry, University of Tokyo, Tokyo, Japan)
Agricultural and Biological Chemistry 36, No. 3, 416-425 (Mar. 1972)

The purpose of this study is to investigate the changes that occur in proteins under roasting conditions at 150°-300° C. and the interaction of proteins with carbohydrates or lipids from the point of view of food chemistry.
[10 figures, 4 tables, 21 references] SW

0.35 (9.19) "NON-CONCEPT" OF "NO-THRESHOLD" CHEMICALS IN THE ENVIRONMENT

Dinman, Bertram D. (Institute of Environmental and Industrial Health, University of Michigan, Ann Arbor, MI 48104)
Science 175, No. 4021, 495-497 (February 4, 1972)

The author states that equating the presence of a biological effect with a deleterious implication ignores several concepts. Because of stochastic considerations, the presence in a cell of a single molecule does not imply a definite potential for a deleterious effect. The belief that such molecules cause an undesirable effect does not consider the presence of interfering substances. Furthermore, the dose of a foreign atom may be related to the probability of the atom interacting with an available active site, or that similar probabilities govern whether interactions will occur at discrete topographical loci upon a structural or functional molecule. It is suggested that a threshold for biological activity exists within a cell at 10^4 atoms.
[2 tables, 12 references] FTP

0.32 PHYSICOCHEMICAL BEHAVIOR OF FISH MEAT PROTEINS. III. PRESENCE OF S-CHAINS OF PROTEIN IN KAMABOKO

Niwa, Eiji, and Masato Miyake (Fac. Fish., Prefect. Univ. Mie, Tsu, Japan)
Chemical Abstracts 76, No. 7, 32968g (Feb. 14, 1972)

0.38 (0.35) INTERACTION OF SPIN-LABELED ANALOGUES OF 1,10-PHENANTHROLINE AND IODOACETAMIDES WITH HORSE LIVER ALCOHOL DEHYDROGENASE

Spallholz, J. E., and L. H. Piette (Department of Biochemistry and Biophysics, School of Medicine, University of Hawaii, Honolulu, Hawaii 96822)
Archives of Biochemistry and Biophysics 148, No. 2, 596-606 (Feb. 1972)

The authors describe the synthesis and interaction of a spin-labeled analog of 1,10-(ortho)-phenanthroline with horse liver alcohol dehydrogenase. They confirmed that 1,10-phenanthroline forms a 1:1 complex with only the two catalytic zincs of the enzyme. The two sulfhydryl groups of horse liver alcohol dehydrogenase presumably associated with enzyme activity have been labeled with two iodoacetamide spin labels with different chain lengths. The authors indicate that the results suggest that zinc and at least one of the sulfhydryl moieties are in close association at the active site.
[9 figures, 2 tables, 23 references] FTP

0.38 (0.35) ESTERASE POLYMORPHISM IN VITREOUS FLUID OF PACIFIC HAKE, MERLUCCIUS PRODUCTUS

Utter, Fred M., Clyde J. Stromont, and Harold O. Hodgins (Biol. Lab., Bur. Commer. Fish., Seattle, Wash.)
Chemical Abstracts 76, No. 5, 23271x (Jan. 31, 1972)

0.4 (0.39) RECONSTITUTION OF DIPHTHERIA TOXIN FROM TWO NONTOXIC CROSS-REACTING MUTANT PROTEINS

Uchida, Tsuyoshi, A. M. Pappenheimer, Jr., and Annabel Avery Harper (Biological Laboratories, Harvard University, Cambridge, MA 02138)
Science 175, No. 4024, 901-903 (Feb. 25, 1972)

The researchers demonstrated that each of the two dissimilar fragments comprising the diphtheria toxin molecule has a separate and distinct function. Further, the toxicity of the toxin depends upon the unique enzymic activity associated with fragment A. This enzymic activity, they indicate, is responsible for the arrest of polypeptide chain elongation in sensitive cells by specific ADP-ribosylation of translocase; however, fragment A can only reach the sensitive cell cytoplasm when it is specifically associated with fragment B.
[2 figures, 1 table, 14 references] FTP

0.4 NITROSAMINES -- AN ENVIRONMENTAL HAZARD?

Walters, C. L.
Technol. Ireland 2, No. 8, 17-19 (1971)
RFMIRA Abstracts 25, No. 2, abstract No. 472, 99 (Feb. 1972)

A discussion of the occurrence of nitrosamines in the human environment and the present state of investigation of their properties and effects is given.
C.S.B. Reprinted

0.38 (0.5) ACID PHOSPHATASE ACTIVITY IN VEGETATIVE CELLS AND SPORES OF CLOSTRIDIUM BOTULINUM TYPE E

Strasdine, G. A., and Joanne M. Melville (Fisheries Research Board of Canada Vancouver Laboratory, Vancouver, British Columbia)
Journal of the Fisheries Research Board of Canada 28, No. 11, 1817-1820 (Nov. 1971)

In a previous study a glucanlike polysaccharide accumulation was demonstrated in the vegetative cells of C. botulinum type E. In studying the biosynthesis of glucan an active phosphatase enzyme system was found. This system catalyzed the liberation of orthophosphate from glucose-1-phosphate and the chromogenic phenolic ester, P-nitrophenyl phosphate. In another study it was demonstrated that sporulation is initiated during the latter stage of glucan accumulation and concides with the exhaustion of exogenous glucose, depletion of intracellular P_i, and an increase in activity of acid phosphatase. The author suggests that the participation of acid phosphatase enzyme in the sporulation process should be considered in attempts to determine the role of the enzyme in cell metabolism.
[4 figures, 13 references] SW

0.38 EFFECTS OF IODINATION AND ACETYLATION OF TYROSYL RESIDUES ON THE ACTIVITY AND STRUCTURE OF ARGININE KINASE FROM LOBSTER MUSCLE

Fattoum, Abdellatif, Ridha Kassab, and Louise A. Pradel (Lab. Biochim. Gen. Comp., Coll. France, Paris, France)
Chemical Abstracts 76, No. 7, 31847e (Feb. 14, 1972)

0.5 STUDIES ON VITAMIN B_6 METABOLISM IN MICROORGANISMS. PART XI. EXTRACELLULAR FORMATION OF VITAMIN B_6 BY MARINE AND TERRESTRIAL MICROORGANISMS AND ITS CONTROL

Tani, Yoshiki, Tsuyoshi Nakamatsu, Yoshikazu Izumi, and Koichi Ogata (Department of Agricultural Chemistry, Kyoto University, Kyoto, Japan)
Agricultural and Biological Chemistry 36, No. 2, 189-197 (Feb. 1972)

This work involved the search for and study of marine and terrestrial microorganisms that are capable of producing extracellularly relatively large amounts of vitamin B_6. Two strains, identified as Flavobacterium sp. and Vibrio sp., that produced extracellularly, relatively high amounts of vitamin B_6 were isolated. The maximum yields of vitamin by these strains were 18 μg. and 5 μg. of vitamin B_6 per ml.

The authors also analyzed several samples of sea water for vitamin B_6 content and found that it was present in sea water as pyridoxine. Of 25 organic carbon compounds tested, glycerol was the most effective in influencing the production of vitamin B_6. [6 figures, 6 tables, 24 references] FTP

0.4 THE OCCURRENCE OF NITROSAMINES IN MEAT PRODUCTS AND THEIR SIGNIFICANCE IN HUMAN HEALTH

Möhler, K.
Meat Ind. Rev., Yugoslavia 3, Nos. 3-4, 21-22 (1971) (In German)
BFMIRA Abstracts 23, No. 2, Abstract No. 473, 99-100 (Feb. 1972)

A note on the occurrence of nitrosamines in meat products with seven references. C.S.B. Reprinted

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0.33 THE INFLUENCE OF WATER CONTENT AND WATER ACTIVITY ON THE SUGAR-AMINO BROWNING REACTION IN MODEL SYSTEMS UNDER VARIOUS CONDITIONS

Eichner, Karl, and Marcus Karel (Department of Nutrition and Food Science, Massachusetts Institute of Technology, Cambridge, MA 02139)
Journal of Agricultural and Food Chemistry 20, No. 2, 218-223 (Mar.-Apr. 1972)

This study was carried out to help elucidate the influence of water content, water activity, dilution of the reactants, and of viscosity on the browning rate of reducing sugars and amino acids. By varying the glycerol content in a sugar amino acid-glycerol-water system, the researchers were able to change the water content of this system and still maintain a constant water activity, and vice versa. Thus, they were able to examine the action of water content and water activity on the browning rate separately. Determination of the influence of dilution of reactants was made possible by adding increasing amounts of glycerol to the system. In order to examine the influence of the diffusion resistance on the browning rate, the viscosity of the system was increased by adding water-soluble polymers and lowering the water activity.

The browning (Maillard reaction) in the model systems decreased with increasing water content, except in the systems in which mobility of reactants became substantially impeded at low water contents. The authors indicated that the effects of water was complex and depended on the presence of various water-binding agents (among other factors). The fact that water is a product of several condensation steps in the browning reaction might account for the inhibitory effect of high water contents.
[10 figures, 3 tables, 8 references] FTP

0.39 (9.15) RELEASE OF HORMONES IN INSECTS AFTER POISONING WITH INSECTICIDES

Maddrell, S. H. P., and S. E. Reynolds (ARC Unit of Invertebrate Chemistry and Physiology, Department of Zoology, Downing Street, Cambridge CB2 3EJ, England)
Nature 236, No. 5347, 404-406 (Apr. 21, 1972)

The authors suggest that the lethal action of insecticides is as follows: (1) disruptive effects on the central nervous system: causes paralysis or behavioral changes; (2) multiple release of neurohormones: causes derangement of many aspects of metabolism. This study indicates that insecticides cause multiple release of neurohormones. It suggests that compounds similar to insect neurohormones might be used directly as insecticides. They would have the advantage of being potent, specific, and biodegradeable.
[5 figures, 1 table, 7 references] SW

0.38 ADENYLATE KINASE IN THE SOLUBLE PROTEINS OF THE OYSTER ADDUCTOR MUSCLE

More, Pol, Marie T. More, Robert Monnet, and Jeanne Poisbeau (Lab. Zool. Fiol. Anim., U.E.R. Sci. Pharm., Nantes, France)
Chemical Abstracts 76, No. 7, 31658u (Feb. 14, 1972)

0.5
(3.4)

FACTORS IN SURVIVAL OF *CLOSTRIDIUM BOTULINUM* TYPE E SPORES THROUGH THE FISH SMOKING PROCESS

Alderman, G. G., Gretchen J. King, and H. Sugiyama (Food Research Institute and Department of Bacteriology, University of Wisconsin, Madison, WI 53706)
Journal of Milk and Food Technology 35, No. 3, 163-166 (Mar. 1972)

Earlier work [L. N. Christiansen, J. Deffner, E. M. Foster, and H. Sugiyama, Appl. Microbiol. 16, 133-137 (1968)] revealed an unsuspected resistance of type E spores of C. botulinum during the smoking of fish. In the present article, the researchers show that survival of type E spores through the fish smoking process is influenced by the moisture levels of the heating environments. In their experiments, fish (chub: Leucichytys hoyi) were experimentally inoculated with 1×10^6 spores of C. botulinum type E and the inoculated fish were given heat treatments equivalent to those used in the commercial smoke processing of these fish (the fish were heated for 30 min. at an internal temperature of 180° F. (82.5° C.) after a come-up time to processing temperature of 2.5 to 3.0 hr.). The researchers found that the percentages of fish treated in this manner and containing viable type E spores were significantly lower among those fish heated in an environment of high moisture content than among fish heated in atmospheres of low moisture content.

In thermal death time (TDT) experiments, minced raw fish and minced fish from previously autoclaved fish were inoculated with C. botulinum type E spores. The type E spores in the raw minced fish were more resistant to heat than were the type E spores in the minced fish from previously autoclaved fish. The authors obtained the same general result using raw and cooked egg whites. They suggest

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0.6
(6.54)

MANIOC

Ayres, John C. (Department of Food Science Division, University of Georgia College of Agriculture, Athens, GA 30601)
Food Technology 26, No. 4, 128-132, 134, 136, 138 (Apr. 1972)

Manioc is also called cassava (English), yuca (Spanish), and mandioca (Portuguese). Sometimes the term tapioca (one of the products prepared from manioc) is used as the common name. The scientific name of the commercial species is Manihot esculenta, Crantz. Manioc is prepared into meal, flour, or starch for use as the major component of rural diets. It also may be used for animal feed and industrial purposes. This article describes the production, processing, and uses of manioc and its product tapioca.

Manioc starch or flour has little nutritive value other than that contributed by its carbohydrate content. Manioc is one of the major products used in the normal food patterns in tropical regions. The author suggests, therefore, that the flour plus adequate amounts of a suitable source of protein (such as fish protein concentrate, soy protein concentrate, torula yeast, or caseinate) be used for large-scale feeding. [4 figures, 4 tables, 38 references]

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(2.05)

STAPHYLOCOCCUS AUREUS AND STAPHYLOCOCCAL FOOD INTOXICANTS. A REVIEW. IV. STAPHYLOCOCCI IN MEAT, BAKERY PRODUCTS, AND OTHER FOODS

Minor, T. E., and E. H. Smith (Department of Food Science and the Food Research Institute, University of Wisconsin, Madison, WI 53706)
Journal of Milk and Food Technology 35, No. 4, 228-241 (Apr. 1972)

The authors review the outbreaks of staphylococcal intoxications involving Genoa sausage, corned beef, barbecued chicken, baked ham, fish, pastries, pie fillings, and other foods. They conclude that the real problems with staphylococcal food poisoning are not associated with the handling and preparation of foods by food processors, but instead with the mishandling of food in food service establishments and in the home. All the information which is needed to prevent outbreaks of staphylococcal food poisoning that originate in food service establishments and in the home is available. Such information must be applied to be beneficial--the consumer must be offered better training in the way foods must to handled to keep them safe. Perhaps it might be appropriate to provide such training at the high school level. [379 references]

FTP

0.8

METHODS OF EVALUATING R&D ORGANIZATIONS

Glass, Edward M. (Defense Research and Engineering, Washington, DC 20301)
IEEE Transactions on Engineering Management EM-19, No. 1, 2-12 (Feb. 1972)

R & D managers have been trying to devise better measures of the effectiveness and usefulness of organizations engaged in research and development. In this paper, the author summarizes some of the techniques used by the Department of Defense in evaluating the effectiveness of its in-house laboratory systems. The purpose of the paper is not to suggest that solutions to the problem of R & D organizational appraisal are in hand, but rather to stimulate interest and discussion in this area. [11 figures, 12 tables, 15 references]

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0.8
(9.7)

EXPLORING NEW DIRECTIONS IN ENGINEERING EDUCATION

Chen, Kan (Electrical Engineering and Environmental Systems Engineering, University of Pittsburgh, Pittsburgh, PA 15213)
Technological Forecasting and Social Change 2, No. 3, 391-396 (1972)

The author develops a framework for thinking about new directions in engineering education. The demand composition in the private and public sector is shifting toward engineers who can attack socially-oriented problems. This shift, the author indicates, reflects the change of our national priorities toward social programs and this shift is likely to continue. [16 references]

FTP

0.6 (9.19) EFFECTS OF HEATING AND COOKING METHOD ON CHLORINATED HYDROCARBON RESIDUES IN CHICKEN TISSUES

Richey, S. J., R. W. Young, and E. O. Essary (Departments of Human Nutrition and Foods, Biochemistry and Nutrition, and Food Science and Technology, Virginia Polytechnic Institute and State University, Blacksburg, VA 24061)
Journal of Agricultural and Food Chemistry 20, No. 2, 291-293 (Mar.-Apr. 1972)

Earlier work has indicated that pesticide residues are deposited into chicken tissues, but little information is available on the fate of the residues during cooking and heating of foods. The present article reports on the effects of cooking and heating on the lindane, endrin, heptachlor, dieldrin, and aldrin present in chicken tissue.

Lindane, endrin, heptachlor, dieldrin, and aldrin were fed at 10 p.p.m. to separate groups of broilers throughout an 8-week growing period. Each group consisted of 30 chicks. The groups were fed the same rations except for the pesticide added to the feed. After the test feeding period, tissues from these birds were cooked by baking, frying, or steaming, and were heated (350° F.) in closed containers for 30, 60, and 90 min.

The pesticide residues (calculated on the dry matter basis) were lowered in the tissues during cooking but the amount of the reduction was not significant in most cases. The level of lindane was reduced considerably when the tissues were heated in closed containers. Heptachlor epoxide concentration in the tissues was lowered during heating, but the concentrations of endrin, dieldrin, and aldrin were not lowered. Apparently, the losses of these pesticide residues occurred primarily by leaching with fat and water (but there was some destruction of lindane and heptachlor epoxide by heating).

[3 tables, 11 references] FTP

0.9 EVALUATION OF METHODOLOGY IN THE UNIVERSITY OF MICHIGAN'S SEA GRANT DELPHI INQUIRY

Ludlow, John D. (University of Michigan Sea Grant Program, Ann Arbor, Mich.)
Sea Grant Technical Report No. 22, (MICHU-SG-72-202), 90 pp. (Feb. 1972) (University of Michigan Sea Grant Program, Ann Arbor, Mich.)

The author evaluates the effectiveness of the Delphi techniques in solving two related management problems: (1) integrating the judgments of an interdisciplinary research team, and (2) conveying its informed insights to regional decision makers. [12 tables, 48 references, 2 appendices] FTP

0.8 (9.19) RENEWING THE SOIL

Meyer, Judith G.
Environment 14, No. 2, 22-24, 29-32 (Mar. 1972)

Compost systems are valuable and possibly essential in the long run but they cost more than the compost is worth. Presently, more economical alternatives to composting are imposing increasing problems of pollution and depletion of natural resources. The author suggests that the realization of the long-term potential of composting requires that individuals, agricultural and industrial concerns, and all levels of government agencies cooperate in the production and utilization of compost. [1 figure, 3 tables, 17 references] FTP

0.5 AUTOTROPHIC AND HETEROTROPHIC NITRIFICATION IN AQUATIC SYSTEMS
[LA NITRIFICATION AUTOTROPHE ET HETEROTROPHE DANS LES ECOSYSTEMES AQUATIQUES]

Laurent, M. (Station d'Hydrobiologie, I.N.R.A., 64-Blarritz, France)
Annales de L'Institut Pasteur 121, No. 6, 795-810 (Dec. 1971) (In French; summary in English) (Masson et Cie Éditeurs 120, Boulevard Saint-Germain, Paris-VIe, France)

This paper reports on studies that help elucidate some of the steps involved in the nitrification process in water and in mud. The author concludes that, under aquatic conditions (that is in rivers, ponds, and lakes), nitrification from ammonia occurs naturally in mud through the action of autotrophic and heterotrophic bacteria growing in micro-aerophilic conditions or by the sole action of heterotrophes in anaerobic conditions. Presumably, in the presence of strongly reduced muds nitrification is absent.

[5 figures, 5 tables, 30 references] FTP

0.5 (3.4)

that the proteins in the raw substrate coagulate and coat the spores, thus the spores would be encased in an environment of low water activity (a_w) in which the spores are better able to withstand heat.

The drippings from the inoculated fish hung for heating contained viable spores and could be a source of cross contamination.

[5 tables, 7 references] FTP

0.6 (9.2) WORLD FOOD AND POPULATION PROBLEMS: SOME POSSIBLE SOLUTIONS

Kharbas, S. S., and D. K. Salunkhe (Utah State University, Logan, UT 84321)
Food Technology 26, No. 4, 148-150, 152, 154, 156-159 (Apr. 1972)

In this article the authors discuss the present sources of food, the amount of food produced, and the difficulties and possibilities of increasing the world food supply with the resources at our disposal. They suggest some ways to help solve the world's food and population problems: (1) Food production could be increased by using our resources properly. This means intensive cultivation of our presently cultivated areas, including the use of irrigation. (2) Crop yields could be increased through the use of fertilizer, by the development of improved varieties of plants, and through the use of chemicals to protect crops. (3) Better use of ocean resources could be achieved by use of certain species of fish for food rather than industrial purposes, by use of fish protein concentrate, and by use of aquatic plant products for human and animal foods. (4) Food supplies could be increased by the development and production of synthetic foods from coal, natural gas, wood, or petroleum. (5) Losses of food could be prevented by application of proper preservation methods and through the control of rats and insects. (6) The use of proper packaging, and storage and transportation facilities would help prevent spoilage and waste. (7) Social and economic obstacles could be adjusted so as to encourage the use of modern technology in the production and distribution of food. (8) Education and training of the labor force would aid in the application of modern food technology. (9) Control of population growth would aid in the successful implementation of programs for economic growth. (10) Assistance to developing nations in the transfer of technology and interest in attaining self-sufficiency will help increase food production.

[7 figures, 7 tables, 22 references] FTP

0.9 (9.2) IMPACT ON RAW-MATERIAL MARKETS OF ENVIRONMENTAL POLICIES

Hazelton, Jared E. (Department of Economics, College of Social and Behavioral Sciences, University of Texas, Austin, TX 78712)
Technological Forecasting and Social Change 3, No. 3, 353-366 (1972)

Technology is responsive to economic and social pressures. These pressures often materialize as political decisions that affect progress. Technological forecasting, therefore, must consider that future socioeconomic conditions will require the creation of new technological capabilities. The authors purpose in this paper was to examine one particular type of socioeconomic change, the increasing public awareness and concern over deterioration of the natural environment, and to analyze the implications of this change for the direction and pace of future technology.

If present trends in population and economic growth continue for the next 30 years, continued conflicts between man's economic activities and the state of the natural environment will occur. These conflicts will lead to continued political pressures for protection of the environment. The course taken, then, by public policies implementing environmental controls will affect not only the future direction of technology, but will also influence an individual firm's opportunities for profitable growth and development.

In this paper, the author presents an analytical framework for viewing the conflict between man's economic activities and his natural environment. He then considers the problems of resource scarcity, recycling of wastes, and pollution control. [4 figures, 1 table, 21 references] FTP

2.03 COMPARATIVE STUDY OF THE MUSCLE CATHEPTIC ACTIVITY OF SOME MARINE SPECIES

Wojtowicz, M. B., and P. H. Odense (Fisheries Research Board of Canada, Halifax Laboratory, Halifax, Nova Scotia)
Journal of the Fisheries Research Board of Canada 29, No. 1, 85-90 (Jan. 1972)

[Cathepsins are proteolytic enzymes occurring at high concentrations in tissues of organs such as kidney, liver, and spleen. They are present in lesser amounts in tissues or other organs including brain, muscle, and erythrocytes.] Catheptic activity is suspected of being responsible for many autolytic changes in fish during storage and processing but the relationship is not clear.

Muscle tissue of some commercially important fish and shellfish were tested for total catheptic activities, which included hemoglobin-splitting activity and endogenous protein-splitting activity. This proteolysis was measured as an increase of "tyrosine-like products."

Samples were taken from white dorsal skeletal muscle of fish kept alive until required. Samples of claw muscle from live crabs and lobsters, and tail muscle from the latter were also taken.

A homogenate of 1 part muscle blended with 10 parts 1% NaCl was prepared and used within 2 to 4 min. An extract was prepared by blending 1 part muscle with 5 parts 1% NaCl. The resultant slurry was frozen overnight, thawed in cold water, and centrifuged at 10,000 g for 20 min. The clear supernatant was used as the muscle extract.

Hemoglobin-splitting activity was determined by incubating at 35° C. 4 volumes of a 1.5% hemoglobin solution in 0.1 M acetate buffer (adjusted to the desired pH), with 1 volume of muscle extract. During incubation samples of the mixture were removed at intervals of 30 and 60 min. Enzymatic activity was

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1.0154 JAPANESE DISTANT-WATER FISHERIES: A REVIEW

Kasahara, Hiroshi (College of Fisheries, University of Washington, Seattle, WA 98195)
Fishery Bulletin 70, No. 2, 227-282 (Apr. 1972)

Most of the industrialized fisheries of Japan have developed under a licensing system controlled by the central government. Limitations on entry and the allocation of resources based on a variety of social and economic considerations have resulted in the development of an extremely diversified industry.

The postwar expansion of distant-water fisheries greatly accelerated the exploitation of resources in the North Pacific, as well as in many other areas of the world, and has caused numerous international conflicts. In addition to regional conventions for high seas fisheries, various bilaterial agreements have been negotiated to cope with problems arising from jurisdictional claims by coastal states. While supporting narrow limits of national jurisdiction and the concept of free access to high seas fishing, Japan has accepted different forms of allocation as a means to accommodate the conflicting interests of the nations involved. Her domestic institutions and organization of the industry have helped the government make pragmatic arrangements with other nations. Whether or not a general agreement on fishery issues can be reached at the new Law of the Sea Conference, Japan will face more and harder international negotiations in view of the general trend of coastal states claiming broader zones of national jurisdiction.

Each of the main sectors of the Japanese fishing industry, including inshore fisheries, offshore fisheries, distant-water fisheries, and aquaculture, now operates under severe constraints. Although the total catch of distant-water fisheries is still increasing due largely to intensified pollack fishing in the Pacific,

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1.0118 SURVIVAL OF SOME FRESHWATER FISHES IN THE ALKALINE EUTROPHIC WATERS OF NEBRASKA

McCarraher, D. B. (Nebraska Game and Parks Commission Office of Limnology, Hastings College, Hastings, NE 68901)
Journal of the Fisheries Research Board of Canada 28, No. 11, 1811-1814 (Nov. 1971)

Survival of 14 species of fish in waters containing minerals causing varying alkalinities was investigated. Sacramento perch (Archoplites interruptus), fathead minnow (Pimephales promelas), northern pike (Esox lucius), and black bullhead (Ictalurus melas) were most tolerant of alkalinities (as Na_2CO_3 and KCO_3) above 300 mg. per liter. A classification index is included that describes lakes which range from slightly to strongly alkaline with suggested fish species for each class. [2 tables, 10 references] SW

2.115 A NOTE ON THE STRIP METHODS ASSOCIATED WITH SHIP MOTION PROBLEMS

Kwon, Y. J., and J. H. Hwang
J. Soc. Naval Archit. Kor. 8, No. 1, 17-28 (1971)
Korean Scientific Abstracts 3, No. 6, Item (71/615), 179 (Dec. 1971)

In this article the authors consider the motion characteristics of the small typical fishing boat (KIST-MRC fishing boat) with transom stern in regular head sea. FTP

1.0154

long-term prospects for further expansion do not appear bright. Little progress has been made in the utilization of abundant resources of unconventional species. Thus, the rapid growth of domestic fishery production is unlikely to continue. Increased joint ventures and other business arrangements in foreign countries may provide a partial solution. Import decontrol for fishery products would contribute substantially to meeting immediate problems of supply shortage.
[18 figures, 6 tables, 27 references] Author's abstract

2.1121 MAKING AND MENDING NETS.
PART SIX: FITTING THE FLOPPER, CHAFERS, FOOTROPE AND COD-LINE

Buckingham, Harry
World Fishing 21, No. 3, 57-58 (Mar. 1972)

The final stages of braiding and equipping a small boat trawl are described. [2 figures] FTP

2.1121 THEORETICAL STUDIES ON THE MECHANICAL CHARACTERISTICS OF TWO-SEAM TRAWL NET

Nakasai, Kei, and Efren Ed. C. Flores
Bulletin of the Faculty of Fisheries Nagasaki University No. 32, 113-128 (Dec. 1971)

A model two-seam trawl net was constructed and tested in a tank of circulating water. [16 figures, 6 references] FTP

2.1121 ON THE COMPARISON BETWEEN TWO-SEAM TRAWL NET AND FOUR-SEAM TRAWL NET

Flores, Efren Ed. C., and Kei Nakasai
Bulletin of the Faculty of Fisheries Nagasaki University No. 32, 129-134 (Dec. 1971)

Models of a two-seam trawl net and a four-seam trawl net of the same size were built and tested in a tank of circulating water. The four-seam trawl seemed to be more efficient than the two-seam trawl.
[4 figures, 5 references] FTP

1.0118 PLANNING FOR THE DEVELOPMENT OF THE COMMERCIAL FISHERY (9.2) IN OKLAHOMA

Mensinger, Gary C.
Completion Report, Feb. 1-May 31, 1971, Project 2-140-R, 7 pp. (June 1971). Oklahoma Department of Wildlife Conservation, Oklahoma City, Okla. Available National Technical Information Service, U.S. Department of Commerce, Springfield, VA 22151. Order No. COM-72-10060.

This report is an aid to public relations and promotion of Oklahoma's fishing program. The history, productivity, and problems of the commercial fishery are summarized. A general plan for promoting the fishery is provided with the output needs from involved agencies. (Author) Reprinted

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0.9 THE SIGNIFICANCE OF SCIENCE

Weisskopf, Victor F. (Massachusetts Institute of Technology, Cambridge, MA 02139)
Science 176, No. 4031, 138-146 (Apr. 14, 1972)

The author discusses the role of science in human affairs. He concludes the article by stating that all aspects and parts of science belong together. For science to develop it must be pursued for the sake of pure knowledge and insight. But science will not survive unless it is used intensely and wisely for the betterment of humanity and not as an instrument of domination of one over another. Compassion and curiosity are two powerful elements in human existence; curiosity without compassion is inhuman and compassion without curiosity is ineffectual.
[6 references] FTP

0.9 SELECTED MATERIALS ON THE PROBLEM OF "NOISE POLLUTION" (9.19) AND CONTROL

Anonymous
Record of the Association of the Bar of the City of New York 27, No. 2, 118-132 (Feb. 1972)

This report lists 5 bibliographies and about 326 references to articles and reports on "noise pollution" and control. FTP

2.03

stopped in the samples by addition of 10% trichloroacetic acid (TCA) in 2.4 M urea. Blanks were prepared by adding TCA to the hemoglobin solution and immediately adding muscle extract without incubation. The treated samples from the incubated mixture were filtered and the filtrate was tested for tyrosinelike products as follows: Folin's phenol reagent was added, followed by a comparison of the resultant absorption at 660 mμ with the standard tyrosine curve.

Autolytic activity was determined by incubating (at 35° C.) the muscle homogenate with an equal volume of 0.2 M glycine-HCl buffer adjusted to pH 3.5. Samples were taken during incubation at 60-min. intervals and treated with TCA. Total nitrogen was determined by the semimicro Kjeldahl method; protein nitrogen was calculated from the results.

The optimum pH for hemoglobin-splitting activity was 3.2 to 3.4 for muscle from all fish species. Activity markedly fell off below pH 3.0 or above pH 3.6.

There was not a great variation in total protein of homogenate from white muscle of all fish species. Protein concentration in muscle extracts varied from 21 to 45% of total tissue protein but the catheptic activity in the extracts represented 42 to 85% of total tissue activity, about a twofold increase in specific activity over the total activity in the homogenates.

Of the species studied, cod (Gadus morhua) muscle showed high hemoglobin-splitting activity and hake (Urophycis tenuis) muscle showed low activity. Lobster (Homarus americanus) and crab (Opilio chionoecetes) claw muscles were higher in hemoglobin-splitting activity than was the muscle of any other fish studied.

These findings, the authors suggest, indicate that the high levels of catheptic activity are not responsible for rapid autolytic changes that occur in fresh fish. And further, hemoglobin-splitting activity of cathepsins is greater than the autolytic activity in the same fish species.
[2 figures, 4 tables, 22 references] SW

2.143 THE USE OF ELECTRICITY IN CONJUNCTION WITH A 12.5-METER (HEADROPE) GULF-OF-MEXICO SHRIMP TRAWL IN LAKE MICHIGAN

Ellis, James E. (Fish Farm Experiment Station, National Marine Fisheries Service, Kelso, AK 71666)
NOAA Technical Report NMFS SSRF-653, iv + 10 pp. (Mar. 1972) (U.S. Department of Commerce, NOAA, National Marine Fisheries Service) For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20420. Price $0.25.

The catching efficiency of a 12.5-meter standard shrimp trawl and the same trawl fitted with three different electrode array systems with power on and power off was investigated. The standard trawl caught 1.54 times or 54.2% more kilograms of fish than the electrode-equipped trawl with power off. The electrode array hanging across the mouth area of the trawl acted as a visual stimulant and thus reduced the trawl's catch rate. Overall the electrical trawl with power on caught 1.19 times or 19.0% more kilograms of fish than the electrical trawl with power off. Array 2 with power on had the best catch rate--1.86 times or 86.9% more kilograms of fish than the power off catch rate. The avoidance of fish to an electrode array was more than offset with the catch rate of array 2 with power on. The dominance patterns of the catches with each system tested did not change significantly with the exception of chub catches with array 2 with power on. Length selectivity was highly significant for chubs caught with arrays 2 and 3 with power on. No significant length selectivity occurred with the other species landed. [11 figures, 4 tables, 5 references] Author's abstract

2.9 INTERACTION BETWEEN PARALYTIC SHELLFISH POISON AND MELANIN OBTAINED FROM BUTTER CLAM (SAXIDOMUS GIGANTEUS) AND SYNTHETIC MELANIN

Price, R. J., and J. S. Lee (Department of Food Science and Technology, Oregon State University, Corvallis, OR 97331)
Journal of the Fisheries Research Board of Canada 28, No. 11, 1789-1792 (Nov. 1971)

Paralytic shellfish poison (PSP) distribution pattern in butter clam siphon (where major amount of PSP accumulates) appears to correspond to the areas of melanin pigmentation. The interaction of melanin and PSP was examined. A melanin preparation from clam siphon and a synthetic melanin were incubated with a purified, standardized PSP preparation. The release of bound PSP was measured after the residue resulting from centrifugation was suspended in buffers of varying pH. The binding increased with increasing pH. In clam melanin, binding to PSP increased from zero at pH 2.0 to a maximum of 63% at pH 6.0. In synthetic melanin, binding to PSP was 100% at pH 5.0 and near 100% between pH 4.0 and pH 8.0. The difference in binding is attributed to a less organized structure in synthetic melanin with greater exposure of reactive sites than in clam melanin.

The reversible nature of the PSP-melanin binding was shown by desorption of increasing amounts of PSP as pH was decreased. This interaction followed a similar pattern reported between PSP and a cation exchanger.
[3 figures, 12 references] SW

2.3 (2.4)(3.249) TEXTURAL CHANGES IN PRECOOKED LOBSTER (HOMARUS AMERICANUS) MEAT DURING REFRIGERATED STORAGE, FREEZING AND FROZEN STORAGE

Dagbjartsson, Bjorn, and Myron Solberg (Rutgers University, New Brunswick, NJ
Journal of Food Science 37, No. 2, 185-188 (Mar.-Apr. 1972)

This paper reports on laboratory studies that were designed to determine (1) the effects on the texture of lobster meat of cooking time and (2) the degree of change in texture as a function of time in precooked lobster meat during refrigerated storage, freezing, and frozen storage (at -12°±2° C. and at -27°±1° C.). The texture of the lobster meat was evaluated by the chew count (sensory) method of G. Harrington and A. M. Pearson [J. Food Sci. 27, 106 (1962)] and A. S. Szczesniak, M. A. Brandt, and H. H. Friedmann [J. Food Sci. 28, 397 (1963)], with some modification. The Warner-Bratzler shear was used for the objective measurement of texture.

Lobster meat (tails) cooked for 10, 20, and 30 min. showed no significant difference in texture. The texture of the precooked lobster meat did not change significantly when the precooked meat was stored at 3°±1° C. for 2 weeks. Also, freezing (air-blast freezer was used--the temperature of the meat reached -40° C. after 5 hr.) and thawing (the frozen samples were held overnight at 5° C., then for 2 hr. at room temperature) the precooked lobster meat had no significant effect on the texture of the meat. When the precooked lobster meat was frozen and held in storage at -12°±2° C. the changes in texture of the meat were significant after it had been stored for 3 to 4 months, but when the meat was stored at -27°± 1° C. significant changes in texture did not occur until after 9 to 10 months of storage. [2 figures, 5 tables, 18 references] FTP

3.249 (8.8) FATTY ACIDS OF CHANNEL CATFISH (ICTALURUS PUNCTATUS)

Worthington, R. E., T. S. Boggess, Jr., and E. K. Heaton (Department of Food Science, University of Georgia College of Agriculture Experiment Stations, Georgia Station, Experiment, GA 30212)
Journal of the Fisheries Research Board of Canada 29, No. 1, 113-115 (Jan. 1972)

As part of a study relating fish culture, processing, and storage practices to composition and product quality, identification of principal fatty acids in lipids of commercial catfish was determined.

Freshly processed, pond raised catfish (eight fish from each of five processing locations) were frozen until tissue samples could be taken for analysis. Duplicate fatty acid methyl ester determinations were made on muscle taken from back, side, and belly flap of each fish, and combined and dried by lyophilization. Methyl esters were analyzed in a gas chromatograph with dual flame ionization detectors. Peaks were identified by comparing with standard retention times.

Of total fatty acids found in sufficient quantity for measurement 23 varied in concentration from 0.1% (22:2 and 24:0) to 42.4% (18:1). The saturated fatty acids comprised 26.5% of the total. Of the unsaturated fatty acids monoenes comprised 48.1%; dienes 13%; trienes 3.1%; and tetraenes 3.6% of total fatty acids. Variations in fatty acids in fish lipids was significant except 20:3, and variation associated with process location was observed.

The authors suggest that variation in fatty acid composition of fish lipids is due to differences in feeds and naturally occurring diverse foods in pond culture. The high value determined for linoleic acid might be expected to contribute (over)

2.9 MARINE TOXINS. XXX. MARINE TOXINS FROM THE PACIFIC. IX. TOXICITY OF THE SURGEONFISHES

Yasumoto, Takeshi, Yoshiro Hashimoto, Raymond Bagnis, John E. Randall, and Albert H. Banner (Fac. Agric., Tohoku Univ., Sendai, Japan)
Chemical Abstracts 76, No. 5, 21752f (Jan. 31, 1972)

2.9 MARINE TOXINS FROM THE PACIFIC. IX. EFFECTS OF CIGUATOXIN ON ISOLATED MAMMALIAN ATRIA

Ohshika, Hideyo (Hawaii Inst. Mar. Biol., Univ. Hawaii, Honolulu, Hawaii)
Chemical Abstracts 76, No. 5, 21755j (Jan. 31, 1972)

2.9 [PURIFICATION OF TWO CRAB PARALYZING TOXINS FROM THE SEA ANEMONE (ANEMONIA SULCATA)]
REINIGUNG ZWEIER KRABBENLÄHMENDER TOXINE AUS DER SEEANEMONE ANEMONIA SULCATA

Béress, Von Lászlo, and Rosemarie Béress (Aus der Zoologischen Station in Neapel und aus dem Institut für Meereskunde an der Universität Kiel, Germany)
Kieler Meeresforschungen 22, No. 3, 117-127 (1971) (In German; abstract in English)
(Institut für Meereskunde an der Universität Kiel, Germany)

Two crab paralyzing toxins were isolated from the sea anemone and were purified. The two toxins are polypeptides. The polypeptides are water soluble and are fairly resistant to heat in acid or in neutral solutions. The toxicity appeared in the tentacles and in the body of the anemone in about the same concentration. [3 figures, 3 tables, 29 references] FTP

2.3 METHOD AND APPARATUS FOR CLEANING CLAMS

Snow, Harold Forest (Scarboro, Me.); assignor to Borden Inc., New York, N.Y. (pat.)
U.S. Patent 3,646,638 (Mar. 7, 1972)

This patent covers the apparatus and method for the selective dissecting of or the removing of a portion of the clam. FTP

2.3 FISH PROCESSING

Seinan Kaihatsu Co. Ltd. (pat.)
Japanese Patent 37234/71
Food Technology 26, No. 4, 170 (Apr. 1972)

Dressed fish are treated with citrate solution at pH of 7. FTP

2.117 CHARACTERISTICS OF KOREAN INSHORE FISHING BOATS (1.0155)

Kim, Keuck Chun
J. Soc. Naval Archit. Kor. 8, No. 1, 67-94 (1971)
Korean Scientific Abstracts 3, No. 6, Item (71/612), 178 (Dec. 1971)

This is an analysis of the characteristics of the existing Korean inshore fishing boats ranging in size from 5 G.T. to 30 G.T.
[Original report contains 9 figures, 16 tables, 23 references] FTP

2.146 ACOUSTIC PROPERTIES OF HIGH FREQUENCIES IN FISH TISSUES

Matsui, Takamitsu, and Keishi Shibata
Bulletin of the Faculty of Fisheries Nagasaki University, No. 32, 85-101 (Dec. 1971)

The authors determined the acoustic properties of fish tissues at high frequencies of ultrasound. Such information is useful in the detection of fish with the use of an echo sounder.
[10 figures, 5 tables, 15 references] FTP

2.1471 WORKING PELAGIC TRAWLS

Chaplin, Peter D. (WFA Industrial Development Unit, Hull, England)
World Fishing 21, No. 3, 13, 15, 17 (Mar. 1972)

During the last few years, large pelagic trawls have been employed on stern trawlers for the exploitation of pelagic fish such as herring. More recently these trawls have been used to catch demersal fish within a few fathoms of the sea bottom. Great care must be exercised in fishing a large pelagic trawl just off the sea bed because the trawl is fragile and can be easily damaged if it comes in contact with the ground. Furthermore, a special problem arises in the use of pelagic trawls on a stern trawler; most of the winches installed on stern trawlers were not designed to haul large pelagic trawls. This article describes some techniques for working the pelagic trawl on a stern trawler using existing winch power. The tests were carried out on a stern freezer trawler of 223 ft. (68 m.) o.a. using 1,600 and 2,000 mesh by 20 cm. pelagic trawls. [2 figures] FTP

3.12 1,2-PROPANEDIOL AS PRESERVATIVE FOR FOODS OF HIGH WATER CONTENT

Obrsh, Edward V., Robert K. Mohrman, Ellen M. Cason, and Thomas J. Ernst (Ralston Purina Co.) (pat.)
German Offen. (Patent) 2,118,961 (Nov. 18, 1971)
Chemical Abstracts 76, No. 7, 33016g (Jan. 31, 1972)

3.12 PREVENTING MELANISM IN SEAFOOD AND THE LIKE

Gutierrez Mullor, Francisco, and Jose M. Vigo Gutierrez
Spanish Patent 368,710 (May 1, 1971)
Chemical Abstracts 76, No. 7, 33018j (Feb. 14, 1972)

3.249 (8.8)

to off-flavors through autoxidation. Variation in fatty acid composition is associated with variations of catfish product flavor, ability to withstand storage conditions, and other quality characteristics. The authors suggest that uniform culture and processing methods would be reflected in uniformity of product quality.
[1 figure, 1 table, 10 references] SW

3.29 STABILITY OF N-NITROSO COMPOUNDS

Fan, T. Y., and S. R. Tannenbaum (Department of Nutrition and Food Science, Massachusetts Institute of Technology, Cambridge, MA 02139)
Journal of Food Science 37, No. 2, 274-276 (Mar.-Apr. 1972)

The stability of four, differently structured N-nitroso compounds was determined in model systems at a temperature of 110° C. over the pH range of from 2 to 12.5 and in reaction media of different chemical composition. The four nitroso compounds studied, representing four different structural characteristics, were N-nitrosopyrrolidine (a heterocyclic nitrosamine); N-nitrososarcosine (a simple dialkylnitrosamine with a carboxylic substitute on the carbon α to the amino group); N-nitrosoproline (has a cyclic structure and a carboxylic group); and dimethylnitrosamine (has neither a cyclic structure nor a carboxylic group).

In general, the four compounds were stable to the heat treatment (110° C.). At pH 6.5 to 8.5, nitrosoproline has a half-life longer than 5 days at 110° C. The average half-life at 110° C. for the four nitrosamines was 21 days. The introduction of a carboxylic group weakens the stability of the nitrosamines at acidic pH values. The cyclic nitrosamines were less stable than were the noncyclic nitrosamines at alkaline pH. The nitrosamines appear relatively unreactive toward certain food components (glucose, ascorbic acid, cysteine, protein, nucleic acid) and thus could survive thermal food processes.
[3 figures, 1 table, 12 references] FTP

4.92 EFFECTS OF ADAPTIVE AND NONADAPTIVE FEEDING OF HYDROGENATED AND RAW HERRING OIL ON HEARTS AND LIVERS OF WEANLING RATS

Odense, P. H., and H. Brockerhoff (Fisheries Research Board of Canada, Halifax Laboratory, Halifax, Nova Scotia)
Journal of the Fisheries Research Board of Canada 28, No. 11, 1793-1795 (Nov. 1971)

Since monounsaturated fatty acids (C_{20} and C_{22}) are reported to have led to cardiac lesions in weanling rats, fish oils containing these fatty acids may be implicated. To investigate the possibility, groups of weanling rats were fed a ration containing either 18% hydrogenated herring oil or 18% raw herring oil for 24 days. Two other groups of weanling rats were gradually adapted to these rations during an initial 12-day period and continued for a total of 24 days also. A control group was fed a ration containing lard and corn oil. Histological examination of heart tissue failed to show any evidence of unusual fat deposition or muscle damage in any of the groups of rats. Histological examination of livers failed to indicate any difference between the control group and the groups fed herring oils. [1 figure, 7 references] SW

3.6 (0.6) PRELIMINARY STUDIES ON SOME PROPERTIES OF INTERMEDIATE MOISTURE, DEEP-FRIED FISH FLESH

Collins, J. L., C. C. Chen, J. R. Park, J. O. Mundt, I. E. McCarthy, and M. R. Johnston (Department of Food Technology, University of Tennessee, Knoxville, TN 37901)
Journal of Food Science 37, No. 2, 189-190 (Mar.-Apr. 1972)

An intermediate moisture food (IMF) is one that has sufficient moisture removed from it so that it is shelf stable (without refrigeration or without having been thermally processed), but is sufficiently moist to be eaten without rehydration. In this study, fillets of cod and of ocean catfish were used in the preparation of IM fish flesh. The fillets were infused with a solution of glycerol, propylene glycol, NaCl, and potassium sorbate. They were then drained and coated with a batter of bread crumbs and wheat flour. The breaded pieces were deep-fat fried for 3 min. at 171° C. For storage studies, samples were placed in glass jars, and the jars were sealed and held at 26.7° C. for up to 5 weeks. The IM cod and ocean catfish samples were examined for content of crude lipids, NaCl, moisture, and glycerol, and for pH, water activity value, and iodine value. The IM ocean catfish product was also examined for total aerobic plate count and mold count, and for presence of Staphylococcus sp.

The initial A_W for the IM catfish product was 0.845 and for the IM cod product was 0.828. There was no significant change in the A_W of these products after 5 weeks of storage at 26.7° C., but there was a decrease in moisture content, in pH, and in the iodine values. Except for one sample, the IM ocean catfish product showed no detectable bacteria, mold, or Staphylococcus sp. The one exception had,

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6.32 (4.19) STEROLS OF SOME CHESAPEAKE BAY ALGAE

Doyle, P. J., and G. W. Patterson (Department of Botany, University of Maryland, College Park, MD 20740)
Comparative Biochemistry and Physiology 41, No. 2B, 355-358 (Feb. 15, 1972)

The principal sterol of seven species of red algae was cholesterol. The principal sterol of three species of green algae was 28-isofucosterol, with lesser amounts of cholesterol and 24-methylene cholesterol.
[1 table, 16 references] FTP

6.31 SYNOPSIS OF BIOLOGICAL DATA ON LAMINARIA HYPERBOREA

Kain, Joanna M. (Marine Biological Station, Port Erin, Isle of Man, United Kingdom)
FAO Fisheries Synopsis No. 87 (FIRM/S87), 65 pp. (Dec. 1971) Food and Agricultural Organization of the United Nations, Rome, Italy (Distribution Restricted)

Laminaria hyperborea is one of the most important commercial seaweeds in Scotland and other parts of the northeastern Atlantic. In Norway and Britain, it is used for the manufacture of alginates. Common names for this seaweed are: Norway--TrollTare; British Isles--Tangle; Germany--Palmentang; and France--Tallipenn. [16 figures, 11 tables, 236 references] FTP

4.9 METABOLISM AND UTILIZATION OF FATS IN MAN

Bour, H.
Annls Hyg. langue fr. 7, No. 3, 15-23 (1971) (In French)
BFMIRA Abstracts 22, No. 2, Abstract No. 459, 97 (Feb. 1972)

6.32 GLYCOLIPIDS PRESENT IN EIGHT GENERA OF THE CHLOROPHYCEAE

Brush, Pamela, and Elizabeth Percival (Department of Chemistry, Royal Holloway College, Engelfield Green, Surrey, England)
Phytochemistry 11, No. 5, 1847-1849 (May 1972)

This paper reports the carbohydrate and fatty acid composition of the monogalactosyl diglyceride (2,3-di-O-acyl-1-O-β-D-galactopyranosyl-(D-glycerol), digalactosyl diglyceride (2,3-di-O-acyl-1-O-β-[6-O-α-D-galactopyranosyl-D-galactopyranosyl]-D-glycerol, and the corresponding trigalactosyl diglyceride of the Chlorophyceae Ulva lactuca, Enteromorpha intestinalis, Cladophora rupestris, Urospora, Codium fragile, Monostroma gravellei, Mougeotia, and Acetabularia crenulata. [1 table, 28 references] FTP

6.33 SHAPELY POLYSACCHARIDES. THE EIGHTH COLWORTH MEDAL LECTURE (6.35)

Rees, D. A. (Unilever Research, Colworth/Welwyn Laboratory, Colworth House, Sharnbrook, Bedford, United Kingdom)
Biochemical Journal 126, No. 2, 257-273 (Jan. 1972)

The author, an active contributor of information on polysaccharides, presented the lecture to the Biochemical Society on September 3, 1971. The lecture was a review of research on the polysaccharides, particularly agarose and carrageenan, otherwise known as agar and Irish moss, respectively. The elucidation of the structure of these complex molecules through X-ray diffraction and other means was discussed. [1 photograph, 17 figures, 64 references] SW

6.30 ON THE CHEMICAL COMPOSITION, DISTRIBUTION AND ECOLOGY OF SOME COMMON BENTHIC MARINE ALGAE FROM ICELAND

Munda, Ivka (Biol. Inst. Slovenska Akademija Znanosti in Umetnosti, Ljubljana, Yugoslavia)
Botanica Marina 15, No. 1, 1-45 (Mar. 1972) (Walter de Gruyter Inc., 162 Fifth Ave., New York, NY 10010)

The author presents information on the ecology, distribution, and chemical composition of some of the most common and abundant benthic algae from the coastal area of Iceland. The purpose was to present preliminary data that might be useful for the future evaluation of these seaweeds as raw materials for various purposes. For most of the abundant species, the author indicates the most suitable areas for harvesting. Some density measurements of certain species are given. The proximate composition was determined for representative samples of the species in question. Data on the mannitol and alginic acid content of brown algae also are given. [21 figures, 5 plates, 2 tables, over 200 references] FTP

4.91 THE ESSENTIAL FATTY ACIDS AND VARIOUS ASPECTS OF THEIR STUDY IN THE FIELD OF NUTRITION

Le Breton, E.
Annls Hyg. langue fr. 7, No. 3, 25-29 (1971) (In French)
BFMIRA Abstracts 25, No. 2, Abstract No. 460, 97 (Feb. 1972)

A general review of work on the effect of linolenic, linoleic and arachidonic acid deprivation on laboratory animals. The author considers that these results are also applicable to Man. L.P. Reprinted

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3.331 INFLUENCE OF PROCESSING ON THE MERCURY CONTENT IN PRESERVED TUNA FISH (9.19)

Pirati, Duilio, Pietro Pizzarotti, Stefano Gherardi, and Gabriele Guidi
Industria Conserve 46, No. 4, 258-264 (Oct.-Dec. 1971)

This paper reports on the effect of steam cooking on the mercury content of three species of tuna (bigeye, yellowfin, albacore). Data also are presented on the comparative effect of steam cooking and cooking in water and in brine (NaCl) on the mercury content of bigeye tuna. During the cooking phase, the mercury loss is about 22% in the water- and steam-cooked tuna fishes and about 8% loss in the brine-cooked fishes. There were no differences in the behavior of the various species as to the loss of mercury during cooking. [1 figure, 10 tables, 50 references] FTP

3.63 DEHYDRATION PROCESS

Nakazono, S. (pat.)
Japanese Patent 33699/71
Food Technology 26, No. 2, 60 (Feb. 1972)

Fish (or meat) byproducts are heated in oil. The solid material is removed from the oil and then it is finely divided. FTP

3.63 PRESERVATION OF FOODSTUFFS

General Foods Corp. (U.S.A.)
British Patent 1,251,357
BFMIRA Abstracts 24, No. 12, Abstract No. 4194, 851 (Dec. 1971)

The preparation of intermediate moisture foods is the subject of the patent. The foodstuff is freeze dried to a moisture content of below 20% by weight in the case of meat and less than 7% in the case of vegetables. The dehydrated foodstuff is then infused with water-soluble solutes to raise the moisture content to 15-45% by weight, the solutes containing sufficient polyhydric alcohol to provide an amount greater than 5% by weight of the foodstuff. Reprinted

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3.63 FOODSTUFF COMPOSITION

General Foods Corp. (U.S.A.)
British Patent 1,251,358
BFMIRA Abstracts 24, No. 12, Abstract No. 4195, 851 (Dec. 1971)

The patent relates to the manufacture of intermediate moisture foods and the control of their A_w. Reprinted

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3.6 (0.6) after 1 week's storage, a bacterial count of 70 bacteria per gram of product. The authors conclude that fish flesh has the potential for preparation into intermediate moisture foods. [3 tables, 18 references] FTP

6.54 (2.06) STABILITY OF FISH SAUSAGE AT LOW TEMPERATURE STORAGE

Hing, Francisco S., Nora Yu-ang Tang, and Catherine G. Cavaletto (Department of Food Science and Technology, University of Hawaii, Honolulu, HI 96822)
Journal of Food Science 37, No. 2, 191-194 (Mar.-Apr. 1972)

Fish sausages consist of ground fish, fat, starch, seasonings, and curing agents. They are packed in plastic casings and processed at 83° to 90° C. for from 40 to 60 min. Fish sausages are perishable; in Japan nitrofuran chemicals are used to help preserve the product (These preservatives are not permitted in the United States.). The purpose of the present study was to determine the stability of a prepared fish sausage stored at 0°, 35°, and 45° F. The formulation of the fish sausage was as follows (all values expressed in grams): Fish meat (45% skipjack tuna and 55% striped marlin)--1,000; ice water--200; vegetable shortening--100; corn starch--80; salt--25; sugar--7; monosodium glutamate--3; spices--5.50 (The spices consisted of white pepper--2, onion powder--1, ginger powder--1, nutmeg powder--1, and garlic powder--5); ascorbic acid--0.05; and sodium nitrite--0.01. The sausages were heated in water (207°±3° F.) in a steam-jacketed kettle; the heating was terminated 30 min. after the sausages reached an internal temperature of 180° F. The cooked sausages were cooled in ice water to an internal temperature of 70° F. The cooked and cooled sausages were immersed in boiling water for 1 min. to shrink the casing. The sausage samples were stored at 0°, 35°, and 45° F., then examined at periodic intervals of storage.

The fish sausage was of good quality as judged by sensory evaluations. The initial bacterial count of the fish sausage, and the counts throughout the 26-week

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6.54 SOME FACTORS INFLUENCING THE PRODUCTION OF PROTEIN ISOLATES FROM WHOLE FISH

Meinke, Wilmon W., Muhammad A. Rahman, and Karl F. Mattil (Texas Engineering Experiment Station, Texas A&M University, College Station, TX 77843)
Journal of Food Science 37, No. 2, 195-198 (Mar.-Apr. 1972)

Four general basic steps are involved in the preparation of protein isolates from fish: (1) the proteins are dissolved in an aqueous medium through the proper adjustment of the pH and by use of certain salts, (2) the undissolved residue (bones, scales) are removed, (3) the protein is recovered from the solution by the adjustment of pH or by dilution, and (4) the recovered protein is purified and dried. The present paper reports some preliminary laboratory data on some factors that relate to production of fish protein isolates, particularly those factors dealing with the solubilization of the protein and the recovery of the protein from solution. Golden croaker, mullet, and carp were used in these tests. The factors considered were: the solubility of the protein of different fishes at different pH values; the solubility of the protein of previously frozen fish at different pH values; the effect of NaCl on the solubility of the fish protein; the effect of ratio of fish to extracting medium on the solubility of the protein; and the effect of temperature on the extraction of protein from the fish.

The data indicate about 45% to 55% recovery of the protein (N×6.25) from the fish as a protein isolate by extraction at pH 3 or pH 10-11 and precipitation of the protein from the extract at pH 5-6. Frozen fish may produce a lower yield of protein isolate than fresh fish may produce. The amount of protein dissolved at 22° C. is independent of the fish solids up to 40 g. per 100 ml. of extractant; however, the actual volume of extract that is recoverable decreases with increased

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7.591 (0.38) ESR PROBING OF MACROMOLECULES: SPIN-LABELING OF THE ACTIVE SITES OF THE PROTEOLYTIC SERINE ENZYMES

Hsia, J. C., D. J. Kosman, and L. H. Piette (Biophysics Laboratory, Department of Biochemistry and Biophysics, School of Medicine, University of Hawaii, Honolulu, Hawaii 96822)
Archives of Biochemistry & Biophysics 149, No. 2, 441-451 (Apr. 1972)

[Spin is a term used in nuclear physics to describe the angular momentum of particles and nuclei. Spin is detected by plotting the spectrum that is produced when a sample of material absorbs electromagnetic radiation at the appropriate frequency. This nuclear magnetic resonance spectrum plot is used to elucidate and identify molecular structure and to detect changes in molecular environment. A molecular structure so identified is called spin-labeled.]

The results of the present experiments indicates that spin-labeled fluorophosphonates react with serine proteinases and esterases in a manner analogous to the common active phosphate ester inhibitors. The reporter group properties of the spin-labeled inhibitors made possible a comparative study of the microstructure of the active sites of these enzymes as well as determinations of rates of inhibition. The effect of various environmental perturbations on the conformation of these active sites has also been probed.
[8 figures, 1 table, 31 references] SW

7.591 (8.59) COMPARATIVE STUDIES OF FISH ADENOSINE DEAMINASES

Ma, Pang F. (Department of Chemistry, Ball State University, Muncie, IN 47306), James R. Fisher (Department of Chemistry and Institute of Molecular Biophysics, Florida State University, Tallahassee, FL 32306)
Comparative Biochemistry and Physiology 41, No. 3B, 469-474 (Mar. 15, 1972)

The study determined the kinds of adenosine deaminases in fish livers and compared them with those in terrestrial vertebrates. Fish livers exhibit all the patterns of adenosine deaminases that have been found in terrestrial vertebrates and about in the same proportion.
[4 figures, 1 table, 7 references] SW

7.591 (0.38) NUCLEOTIDE PYROPHOSPHATASES. PURIFICATION AND PROPERTIES OF AN ENZYME FROM LIVERS OF FRESH WATER FISHES (WALLAGO ATTU)

Krishnan, N., and N. Appaji Rao (Dep. Biochem., Indian Inst. Sci., Bangalore, India
Chemical Abstracts 76, No. 9, 43269f (Feb. 28, 1972)

7.80 PHYSIOLOGICAL ASPECTS OF TEXTURE PERCEPTION INCLUDING MASTICATION

Yeatman, John N. (Food and Drug Administration, Bureau of Foods, U.S. Department of Health, Education and Welfare, Washington, DC 20204)
Food Technology 26, No. 4, 141-142, 144, 147 (Apr. 1972)

This article is a review of some of the literature on sensory perception of food texture including certain literature dealing with the physiology and psychology of mastication. [5 figures, 15 references] FTP

7.592 STUDIES ON SILVERING OF FISH SKIN. I. PURINES IN THE SKIN OF CULTURED SALMON AND TROUT

Fuji, Y., J. Yamada, and T. Onishi
Bull. Jap. Soc. Scient. Fish. 37, No. 1, 55-62 (1971) (In Japanese; tables and summary in English)
BFMIRA Abstracts 25, No. 1, Abstract No. 83, 18-19 (Jan. 1972)

Examination of the guanine and hypoxanthine levels in the skin of several kinds of salmon and trout revealed that the purines were higher in the ventral skin of the fish than in the dorsal skin. Purines in non-silver fish decreased as the fish grew from 5 to 32 months. However, silver fish examined over the same period showed purine levels up to ten times those in the non-silver fish. D.M.L. Reprinted

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7.42 THE INCIDENCE OF METALS IN FOOD

Chapman, W. B.
J. ass. publ. Analysts 9, No. 3, 65-75 (1971)
BFMIRA Abstracts 25, No. 1, Abstract No. 117, 26 (Jan. 1972)

This report is concerned primarily with the incidence of mercury in foods and a number of tables giving mercury levels for common foodstuffs are included: mercury in food derived from pesticides, mercury contamination of canned tuna, canned salmon, fresh and canned shellfish and crustaceans, other canned fish, fresh white fish, and foods other than fish. D.M.L. Reprinted

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7.51 ELECTRICAL FIELD-FLOW FRACTIONATION OF PROTEINS (0.321)

Caldwell, Karin Dahlgren, Laya Floch Kesner, Marcus N. Myers, and J. Calvin Giddings (Department of Chemistry, University of Utah, Salt Lake City, UT 84112)
Science 176, No. 4032, 296-298 (Apr. 21, 1972)

Field flow fractionation is a separation method in which electrical fields of various voltages applied across a narrow tube, working in conjunction with flow characteristics of a solution, cause the migration of molecules and ions to specific zones on the tube wall. Three proteins in a mixture were separated by this method. [3 figures, 7 references] SW

6.54 MARINE PROTEIN CONCENTRATE

Gulf Coast Institute of Research and Technology, Inc. (pat.)
British Amended (Patent) 1,156,500 (Mar. 5, 1971)
Chemical Abstracts 76, No. 7, 33022f (Jan. 31, 1972)

7.42 SEMIAUTOMATED DETERMINATION OF MERCURY IN ANIMAL TISSUE

Armstrong, F. A. J.; and J. F. Uthe (Freshwater Inst., Fish. Res. Board Canada, Winnipeg, Manitoba, Canada)
Chemical Abstracts 76, No. 7, 32008u (Feb. 14, 1972)

6.54 (2.06)

storage period at 0°, 35°, and 45° F., were less than 300 bacteria per gram. The fish sausage was stable (as judged by aroma and flavor) for 15 weeks at 35° F., and there was only a slight change in quality even after 26 weeks of storage at 35° or 45° F. The frozen product (0° F. storage) had a spongy appearance after it was thawed. The authors considered the storage life of the fish sausage as extremely good, because they indicate that the storage life of kamaboko (fish cake) is only about 2 weeks and of frankfurters is only about 4 weeks at 45° F.

The composition of a typical fish sausage is: moisture--66.1%; total protein (N×6.25)--18.2%; crude fat--5.8%; ash--3.6%; carbohydrate (by difference)--6.1%; and salt--1.7%. The pH is about 6.1.

[4 figures, 4 tables, 16 references] FTP

6.13 DEFATTED FISH MEAL

Japan Oxygen Co. Ltd. (pat.)
Japanese Patent 38543/71
Food Technology 26, No. 4, 170 (Apr. 1972)

Finely divided fish is frozen by contact with a liquified gas, then the lipids are extracted with an aliphatic solvent. FTP

6.54 FISH PASTE PRODUCT

Zenkoku Kamaboko Suisan Kakogyo Kyodo Kumiai Rengokai (pat.)
Japanese Patent 39059/71
Food Technology 26, No. 4, 170 (Apr. 1972)

Surfactants plus certain organic acids (such as lactic, citric, oxalic, and maleic acids) are used in fish paste products to minimize discoloration. FTP

6.54

proportion of fish. When the fish is extracted at 55° C., gelatinization occurs and the recovery of the extract by centrifuging is impaired at pH 3. The solubility of the protein is decreased by NaCl at high and at low pH values, but NaCl increases the solubility of the protein at the pH of minimum protein solubility.

The potential nutritive value of fish protein isolates, on the basis of amino-acid content, appears to exceed that of fresh fish and of fish protein concentrate (FPC). [2 figures, 4 tables, 6 references] FTP

7.8 (0.5) COMPARISON OF METHODS OF ESTIMATING THE NUMBER OF ESCHERICHIA COLI IN EDIBLE MUSSELS AND THE RELATIONSHIP BETWEEN THE PRESENCE OF SALMONELLAE AND E. COLI

Thomas, K. L., and Armorel M. Jones (Public Health Laboratory, Conway, North Wales, United Kingdom)
Journal of Applied Bacteriology 34, No. 4, 717-725 (Dec. 1971)

The authors tested four methods of assessing the bacteriological quality of mussels. The method of the Fishmongers' Company [F. A. Knott, "Memorandum on the Principles and Standards Employed by the Worshipful Company of Fishmongers in the Bacteriological Control of Shellfish in the London Markets," London: Fishmongers' Company (1951)] was the most useful from the public health aspect where facilities are limited. A modification of the method of L. F. L. Clegg and H. P. Sherwood by N. Reynolds and P. C. Wood [J. Appl. Bact. 19, 20 (1956)] was more sensitive and more simple to perform and is recommended for routine use. The authors suggest that two E. coli cells/ml. of mussel tissue is probably the upper acceptable limit for satisfactory grading of mussels. Further, the presence of small numbers of salmonellae in purified mussels may not be highly significant. [4 tables, 10 references] FTP

7.86 INDUSTRIAL ADVANTAGES OF FA TESTING FOR SALMONELLAE

Insalata, Nino F., W. Gail Dunlap, and Cy W. Mahnke (General Foods Corporation, Post Division Research, 275 Cliff St., Battle Creek, MI 49016)
Food Technology 26, No. 4, 124, 126 (Apr. 1972)

The method of testing for salmonellae in food published by the Association of Official Agricultural Chemists [Anonymous, JAOAC 50, 753 (1967)] is time consuming (5 to 7 days) and laborious. Food plants using this method must, therefore, maintain considerable storage space to hold the foods until the tests are completed. Furthermore, this storage inventory buildup may result in costly delays in shipping such products. The senior author, in a 2-year study, developed a rapid, direct fluorescent antibody (FA) method for the detection of salmonellae in foods and feeds [Bacterial. Proc. p. 6 (1971)]. By use of this FA method, salmonellae can be detected in 24 to 32 hr. of elapsed time. Also, by the statistical use of combining and integrating samples, more samples can be examined than would be routinely possible. This new FA method will detect salmonellae in the range of 1×10^4 cells per ml. of an elective enrichment broth. The FA technique may be used as a rapid screening tool and has been, in fact, used successfully in the continuous monitoring of raw materials, finished products, and environmental process samples. The authors indicate that the advantages of the FA method for the detection of salmonellae are: (1) It is more sensitive than the cultural method, (2) it has greater specificity through the use of a specific antiserum, (3) it offers increased statistical safety as a result of compositing and integrating samples (This makes possible the testing of a greater number of samples simultaneously.), and (4) the test time required for the FA method is about 32 hr. (5 days for the cultural method). [17 references] FTP

8.0 (4.91) FATTY ACID CONTENT AND PROXIMATE ANALYSIS OF BAY, CALICO, SEA AND WEATHERVANE SCALLOP ADDUCTOR MUSCLE

Krzeczkowski, Richard A., Richard D. Tenney, and Murray L. Hayes (Fishery Products Technology Laboratory, National Marine Fisheries Service, NOAA, U.S. Department of Commerce, P.O. Box 1638, Kodiak, AK 99615)
Journal of Food Science 37, No. 2, 300-301 (Mar.-Apr. 1972)

This article contains data on the fatty acid content of and the proximate composition of the adductor muscle of bay, calico, sea, and weathervane scallops. The proximate composition of the raw adductor muscle of the scallops is shown in the following table:

Species of scallop	Composition of the raw adductor muscle			
	Moisture	Protein	Lipid	Ash
	%	%	%	%
Bay	82.9	14.4	0.7	1.6
Calico	82.1	15.4	1.0	1.7
Sea	80.4	17.1	0.9	1.7
Weathervane	80.9	16.6	1.1	1.5

For all the scallops tested, saturated fatty acids accounted for 24% to 30% of the total fatty acid content and monounsaturated fatty acids accounted for 24% to 30%. The polyunsaturated acid content of the total fatty acids from the (over)

8.8 FLAVOR EVALUATION OF VARIOUS MILK, VEGETABLE, AND MARINE PROTEIN SOURCES

Maga, J. A., and K. Lorenz (Department of Food Science and Nutrition, Colorado State University, Fort Collins, CO 80521)
Journal of Milk and Food Technology 35, No. 3, 131-135 (Mar. 1972)

The purpose of this study was to compare certain sensory and chemical properties of eight currently available and representative samples of protein supplements. Sensory evaluations consisted of the examination of the samples by taste and smell for blandness of flavor and odor. Chemical evaluations involved testing for content of moisture, protein, fat, ash, and fiber and the determination of pH of the sample suspended in distilled and demineralized water. The composition of the protein supplements is listed in the table that follows. (over)

8.8 BACTERIOLOGICAL EXAMINATION OF RAW BREADED FROZEN SHRIMP

Nickerson, J. T. R. (Department of Nutrition and Food Science, Massachusetts Institute of Technology, Cambridge, MA 02139), and G. A. Pollak (Consumers Union of United States, Mount Vernon, NY 10550)
Journal of Milk and Food Technology 35, No. 3, 167-169 (Mar. 1972)

Thirty-four lots of commercially prepared frozen, raw breaded shrimp were analyzed for total plate counts and were tested for enterococci, total coliforms, and Escherichia coli. The lots represent different commercial packers and the samples were picked up in various cities of the United States.

The plate counts for individual sample lots varied from 24,000 to 60,000,000 bacteria per gram (2 sample lots had counts between <50,000; 3 sample lots had counts between 50,000 to <100,000; 4 sample lots had counts between 100,000 and <500,000; 8 sample lots had counts between 500,000 and <1,000,000; 16 sample lots had counts between 1,000,000 and 6,200,000). The counts of enterococci (number per gram) ranged from 45 to 17,000 (3 sample lots had less than 100 enterococci per gram; 10 sample lots had between 100 to <500; 5 sample lots had between 500 and <1,000; 16 sample lots had between 1,000 and 42,000). The most probable number of coliforms (number per gram) ranged from <0.3 to 88.5 (11 sample lots had <0.3 to <5; 4 sample lots had between 5 and <10.0; 15 sample lots had between 10 and <50; 4 sample lots had 50 to 88.5). The most probable number of E. coli (number per gram) ranged from 0.1 to 8.3 (26 sample lots had between 0.1 and <1; 5 sample lots had between 1.0 and <2.0; 3 sample lots had between 2.0 and 8.3).
[1 table, 8 references] FTP

8.8

Product	Moisture	Protein	Fat	Ash	Fiber	pH
	%	%	%	%	%	
Nonfat dry milk (low heat)	3.2	35.7	1.0	8.1	--	6.79
Nonfat dry milk (high heat)	3.1	35.6	1.0	8.1	--	6.85
Whole milk powder	2.1	26.3	27.6	5.9	--	6.83
Whey powder	4.7	11.8	1.1	8.1	--	6.06
Demineralized whey powder	4.0	35.2	3.1	2.8	--	6.65
Buttermilk powder	4.3	34.1	5.2	7.5	--	6.65
Sodium caseinate	3.6	90.3	1.1	3.9	--	6.96
Calcium caseinate	4.0	91.2	1.2	4.7	--	6.85
Isolated soy proteinate	4.9	92.0	0.4	3.9	0.2	7.04
Soy protein concentrate	7.8	65.1	0.4	4.7	2.9	6.92
Defatted soy flour (toasted)	6.3	52.8	1.0	6.0	2.4	6.82
Peanut flour	7.1	48.2	9.3	4.1	3.0	6.75
Fish protein concentrate	2.1	78.2	0.4	19.0	--	6.50
Cottonseed flour	9.6	54.5	2.4	6.9	3.2	6.61

Cottonseed flour powder had the most bland odor. Reconstituted low heat nonfat dry milk was rated the most bland in flavor and odor. Fish protein concentrate was rated the least bland of the products tested.
[6 figures, 1 table, 19 references] FTP

8.51 AMINO ACID COMPOSITION OF FISH SKIN MUCIN

Uskova, E. T., A. V. Chaikovskaya, and I. A. Uskov (Inst. Gidrobiol., Kiev, U.S.S.R.)
Chemical Abstracts 76, No. 3, 12127d (Jan. 17, 1972)

7.8 (4.5) DECREASE RATE OF $C_{22:6}$ ACID AS AN INDEX TO OXIDATIVE DETERIORATION OF LIPIDS IN FISH PRODUCTS

Shono, Toshihiko, and Masamichi Toyomizu
Science Bulletin of the Faculty of Agriculture Kyushu University 47, No. 3, 233-239 (Mar. 1972) (In Japanese; summary in English)

Peroxide values, carbonyl values, and 2-thiobarbituric acid values are commonly used as a measure of the deterioration of lipids in fishery products. However, the authors indicate, these tests are not always accurate indicators of oxidative deterioration because the tests are based on the analysis of unstable oxidative products. Furthermore, these unstable oxidative products may react with components of the fishery products. To evaluate the oxidative deterioration in the lipids of fish meal and lyophilized fish, the authors suggest the measurement of the peak area ratio of $C_{22:6}$ to $C_{16:0}$ acids on gas chromatograms and the calculation the rate of decrease of the $C_{22:6}$ acid as follows:

Rate of decrease of $C_{22:6}$ acid (%) =

$$\left(1 - \frac{tC22:6/tC16:0}{oC22:6/oC16:0}\right) 100$$

The authors determined the rate of decrease of $C_{22:6}$ acid, the peroxide values, and the 2-thiobarbituric acid values for the extracted lipids of a fish meal and of lyophilized fish muscle from jack mackerel (Trachurus japonicus) during the course of deterioration of the lipids in these products. They found that the rate of decrease of $C_{22:6}$ acid was a better measure of the oxidative deterioration of the lipids of these products than were the peroxide values and the 2-thiobarbituric acid values.
[7 figures, 25 references] FTP

8.0 (4.91)

adductor muscle was 56.9% for the calico scallop, 58.3% for the bay scallop, 61.1% for the sea scallop, and 61.1% for the Weathervane scallop.
[2 tables, 18 references] FTP

8.9 (6.54) RADIONUCLIDES AND SELECTED TRACE ELEMENTS IN MARINE PROTEIN CONCENTRATES

Beasley, T. M.; T. A. Jokela; and R. J. Eagle (Coll. Fish., Univ. Washington, Seattle, Wash.)
Chemical Abstracts 76, No. 7, 32974f (Feb. 14, 1972)

7.85 (0.5)(2.01) ORIENTED INVESTIGATIONS INTO THE MICROBIOLOGICAL QUALITY OF FRESH FISH

Münzer, R.
Arch. Lebensmittelhyg. 22, No. 10, 220-223 (1971) (In German)
BFMIRA Abstracts 25, No. 1, Abstract No. 54, 11 (Jan. 1972)

A table is given of the total count, coliform, enterococci and staphylococci counts of various types of fresh fish including herring, mackerel, cod, shellfish. Reprinted C.S.B.

9.10 (9.11) RATE AND EXTENT OF DECOMPOSITION OF DISSOLVED ORGANIC MATTER IN SURFACE SEAWATER

Ogura, N. (Department of Chemistry, Tokyo Metropolitan University, Setagaya-ku, Tokyo, Japan)
Marine Biology 13, No. 2, 89-93 (Mar. 1972)

This experiment on the decomposition of the dissolved organic matter (DOM) in the surface sea water was carried out under controlled laboratory conditions aboard ship in the north-equatorial Pacific. The dissolved organic carbon in the surface sea water decreased from 0.96 to 0.74 mg. of carbon per liter after the sea-water sample was incubated for 50 days in the dark at 25° C. The surface sea water seemed to contain two labile fractions of dissolved organic matter and one refractory fraction. The first labile fraction represents about 10% to 20% of the total dissolved organic matter and is utilized within 50 days. The second labile fraction represents 30% to 40% of the total dissolved organic matter. The refractory fraction is 50% to 60% of the total dissolved organic matter and it is not readily available to microorganisms. The author estimated that the rate of decomposition of the total dissolved organic matter was 0.0052 day^{-1} and that for the first labile fraction was 0.033 day^{-1}. The half-life for the total dissolved organic matter was estimated at 130 days and that for the first labile fraction was estimated at 20 days. The author postulates that the two labile fractions, especially the first labile fraction, serve as food for microorganisms.
[2 figures, 4 tables, 29 references] FTP

9.10 SYNOPSIS OF BIOLOGICAL DATA ON HADDOCK MELANOGRAMMUS AEGLEFINUS (LINNAEUS) 1758

Blacker, R. W. (Fisheries Laboratory, Lowestoft, England)
FAO Fisheries Synopsis No. 84, v + 47 pp. (1971) (Distribution restricted) Food and Agriculture Organization of the United Nations, Rome, Italy

This is another of a series of documents issued by FAO, CSIRO, AND NMFS on species and stocks of aquatic organisms of present or potential commercial interest. The purpose of the documents is to provide fishery scientists with existing information in a standard format. [161 references]

Other synopses in this series issued since Jan. 1970 include: (1) National Marine Fisheries Service (Publications Distribution Unit, NOAA, U.S. Department of Commerce, Rockville, MD 20852)

BCF/S41, Chum salmon Oncorhynchus keta; NMFS/S79, Pacific Ocean perch Sebastodes alutus; (2) FAO (Via delle Terme di Caracalla, 00100 Rome, Italy) (Distribution restricted) DFO/S4, rainbow prawn Parapenaeopsis sculptilis; DFO/S5, school prawn Metapenaeus macleayi; DFO/S6, greentail prawn M. bennettae; DFO/S7, eastern king prawn Penaeus plebejus; DFO/S8, banana prawn P. merguiensis; FIRI/S80 (Rev. 1) eel Anguilla anguilla; FIRM/S82, North Atlantic sandeels of the genus Ammodytes (A. tobianus, A. dubius, A. americanus, A. marinus); FIRM/S83, Saccorhiza polyschides; FIRM/S38, knobbed wrack Ascophyllum nodusum; FIRM/S84, haddock Melanogrammus aeglefinus; (3) published in the Proceedings of the World Conference on the Biology and Culture of Shrimps and Prawns, Mexico City, Mexico, 12-21 June 1967 FIRM/S91, Crangon crangon; --S92, Pandalus montagui; --S93 jumbo tiger prawn Penaeus monodon; --S94, Indian prawn Penaeus indicus; --S95, prawn Pandalus platyceros; --S96, penaeid prawn Solenocera indica; --S97, penaeid prawn Metapenaeus

 (over)

9.15 EPIDEMIOLOGICAL MODEL FOR PASSIVE TRANSFER OF IPNV BY HOMEOTHERMS

Sonstegard, R. A., and L. A. McDermott (Department of Microbiology, College of Biological Science, University of Guelph, Guelph, Ontario, Canada)
Nature 237, No. 5350, 104-105 (May 12, 1972)

IPNV (infectious pancreatic necrosis virus) is a highly infectious virus of salmonid fishes and it has been isolated from almost every trout producing area of the world. The purpose of the present study was to find out whether free living warmblooded animals that have eaten IPNV-infected animals can transfer the infectious virus and can become actively infected with the agent. About $10^{8}TCD_{50}$ IPNV virus were inoculated into chicken, great horned owl, great blue heron, common eider, and American merganser. A virus suspension was introduced directly into the digestive tract using a syringe fitted with a piece of rubber tubing. Mink were inoculated with the virus by feeding them fish that had been injected with IPNV. Fecal samples were assayed for IPNV by the method of K. Wolf, M. C. Quimby, C. P. Carlson, and G. L. Bullock [J. Fish. Res. Board Canada 25, 383 (1968)]. The heron and the mink were killed 7 days after they were inoculated with IPNV and their spleen was examined for the virus by the method of G. H. Hoffman, S. F. Snieszko, and K. Wolf [U.S. Bureau Sport Fisheries and Wildlife, FDL-9 (1968)].

Infectious pancreatic necrosis virus was found in the feces of chicken, great horned owl, and mink but not in the feces of the American merganser, common eider, and great blue heron. IPNV was not detected in the spleen of the great blue heron and the mink.

(over)

9.15 (9.13) AN INTERACTION OF DDT IN THE METABOLISM OF ESSENTIAL FATTY ACIDS

Tinsley, I. J., and R. R. Lowry (Department of Agricultural Chemistry, Oregon State University, Corvallis, OR 97331)
Lipids 7, No. 3, 182-185 (Mar. 1972)

Groups of male and female rats were fed rations modified as follows: supplemented with essential fatty acids (EFA) and with DDT; deficient in EFA, and no DDT; deficient in EFA, containing DDT; supplemented with EFA and no DDT. After 12 weeks the rats were analyzed for body weight, liver weight, and fatty acids in the liver lipids. The growth decline of female rats on an EFA deficient ration declined further with the addition of DDT. The growth of male rats was not affected by this diet. Fatty acid composition of liver lipids was altered also by EFA deficient rations containing DDT as follows: fatty acids 18:0, $20:3_{\omega}9$ and $20:4_{\omega}6$ were increased with corresponding decreases in fatty acids 16:0, 14.0, and 16:1. These changes in liver lipid content, the authors suggest, is related to the DDT induced increase in the level of smooth endoplasmic reticulum tissue which is composed of the same proportions of fatty acids. In male rats with the EFA supplemented diet, DDT caused a 31% increase in liver size and a 38% increase in the proportion of the linoleic (ω 6) series of polyunsaturated fatty acids in liver lipids. The authors suggest that the increased proliferation of hepatic smooth endoplasmic reticulum induced by DDT could increase the demand for EFA by the liver thus influence EFA nutrition.
[1 figure, 3 tables, 9 references] SW

9.10

dobsoni; --S98, penaeid prawn M. affinus; --S99, ocean shrimp Pandalus jordani; --S100, camarón blanco Penaeus schmitti; --S101, white shrimp Penaeus setiferus; --S102, brown shrimp Penaeus aztecus aztecus; --S103, pink shrimp Penaeus duorarum; --S104, penaeid prawn Metapenaeus monoceros; --S105, penaeid prawn M. brevicornis; --S106, penaeid prawn Parapenaeopsis stylifera; --S107, camarón nailon Heterocarpus reedi. [161 references] FTP

9.11 COLOR PERCEPTION UNDERWATER

Behan, Frances L., Richard A. Behan, and Herbert W. Wendhausen (Empirical Research Group, Canoga Park, Calif.)
Human Factors 14, No. 1, 41-44 (Feb. 1972)

Scuba divers examined 13 plates of a standard diagnostic color perception test at depths of 30, 60, and 90 feet in the ocean. In clear water, under low illumination, the subjects were able to detect colors in the full range of the visible spectrum at 90 ft. However, low saturation (those with poor background contrast) greens and reds were difficult to identify. All the colors seemed to be somewhat faded due to the low contrast and the low illumination.
[2 tables, 4 references] FTP

8.8 (0.3) EFFECT OF SOME WATER-SOLUBLE COMPONENTS ON AROMA OF HEATED ADIPOSE TISSUE

Wasserman, Aaron E., and Ann Marie Spinelli (Eastern Regional Research Laboratory, U.S. Department of Agriculture, Philadelphia, PA 19118)
Journal of Agricultural and Food Chemistry 20, No. 2, 171-174 (Mar.-Apr. 1972)

Only a little is understood of the flavor of meat and meat products. E. L. Pippen, E. P. Mecchi, and M. Nonaka [J. Food Sci. 34, 436 (1969)] found that raw chicken fat, extracted from adipose tissue, did not develop characteristic odor on heating, but the fat from cooked or roasted chicken did have typical chicken aroma. They thought that the components responsible for aroma originate in the lean portion and are trapped or dissolved in the fat during the cooking process. The present article reports on studies of components of adipose tissue of beef, pork, and lamb that may be involved in the development of meat aroma.

The characteristic aromas of heated pork, beef, and lamb adipose tissues were found in the lipids extracted with chloroform:methanol (2:1 mixture). Also, water-washing the solvent extracts removed components that are involved in forming the characteristic odors. Various amino acids and glucose were found in the water-soluble fraction from the chloroform:methanol extracts of the adipose tissues. The water-soluble fraction gave a nonspecific meat aroma on heating to dryness. One table lists the amino-acid composition of the water-soluble fraction from chloroform:methanol extracts of the adipose tissues of beef, pork, and lamb. Data for beef are as follows (in μM/100 g. of tissue): Cysteic acid, 1.95; Tau, 9.20; Urea, 39.15; Asp., 3.60; Asp.-NH_2 + Thr., 3.85; Ser., 3.90; Glu., 4.90; Pro., 4.45; Gly., 13.20; Ala., 25.75; Val., 3.90; Met., 0.90; Ile., 6.55; Leu., 4.35; Tyr., 1.65; Phe., 2.50; NH_3, 2.90; Lys., 0.95; Anserine, 0.50; Carnosine, 0.85; Arg., 0.80.
[3 figures, 2 tables, 8 references] FTP

9.13 STUDIES ON THE METABOLISM OF FATTY ACID IN FISH-- I. β-OXIDATION OF FATTY ACID BY CARP HEPATOPANCREAS MITOCHONDRIA

Murata, Hisashi, and Masamichi Toyomizu,
Science Bulletin of the Faculty of Agriculture Kyushu University 47, No. 3, 227-231 (Mar. 1972) (In Japanese; summary in English)

This paper is concerned with the occurrence of and some properties of the β-oxidation system in the carp's hepatopancreas mitochondria. The occurrence of the β-oxidation system in the carp hepatopancreas mitochondria was confirmed by the evidence obtained in this study.
[5 figures, 3 tables, 7 references] FTP

9.16 A MANUAL FOR CULTURE OF PINK SHRIMP, PENAEUS DUORARUM, FROM EGGS TO POSTLARVAE SUITABLE FOR STOCKING

Tabb, D. C., W. T. Yang, Y. Hirono, and J. Heinen
University of Miami Sea Grant Special Bulletin No. 7, 59 pp. (1972). Price $1.00

This provisional manual was prepared in response to many requests for a concise description of the techniques used at the University of Miami in rearing the pink shrimp, Penaeus duorarum Burkenroad, from eggs to postlarval size in capticity. Facilities and methods for mass production of postlarval pink shrimp are described in detail. The general techniques can be applied to some extent to the rearing of other species of Penaeus. The bulletin can be purchased from Information Services, Sea Grant Program, University of Miami, 10 Rickenbacker Causeway, Miami, FL 33149. Charles W. Caillouet

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9.15 REVISED ANNOTATED LIST OF PARASITES FROM SEA MAMMALS CAUGHT OFF THE WEST COAST OF NORTH AMERICA

Margolis, L. (Fisheries Research Board of Canada, Biological Station, Nanimo, British Columbia, Canada), and M. D. Dailey (Department of Biology, California State College at Long Beach, Long Beach, CA 90801)
NOAA Technical Report NMFS SSRF-647, 23 pp. (Mar. 1972) (National Marine Fisheries Service, NOAA, U.S. Department of Commerce, Seattle, WA 98115) For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. Price $0.35.

This report lists the parasite-host and host-parasite, with supporting references, of the ecto- and endoparasites recorded from marine mammals of the North American west coast. [141 references] FTP

9.15

Because the IPNV virus was found in the feces of the chicken, owl, and mink, warmblooded animals could possibly serve as "mechanical vectors" of the virus. T. V. Meyers, J. Scala, and E. Simmons [Nature 227, 623 (1970)] have suggested that the passive "mechanical vector" mechanism may be a mode of spread of whirling disease of salmonid fishes (This disease is caused by the protozoan Myxosoma cerebralis.). The authors suggest that the possibility that free living wildlife (poikilotherms and homeotherms) may transfer or be infected with agents pathogenic for hatchery fish (and vice versa) should not be overlooked.
[10 references] FTP

9.16 THERMAL AQUACULTURE: ENGINEERING AND ECONOMICS

Yee, William C. (Oak Ridge National Laboratory, Oak Ridge, TN 37830)
Environmental Science & Technology 6, No. 3, 232-237 (Mar. 1972)

Thermal effluents from electric generating plants are of increasing public concern while demand for electrical power is expected to double in the next decade. For every kilowatt generated, between 1 and 2 kilowatts, as heat, will be produced and discharged into air or water as waste. This waste heat could be considered a resource that is applicable to agriculture or aquaculture. The author surveys experimental applications of thermal effluents to growth of aquatic species. The Japanese, pioneers in aquaculture, have grown fish in running water under controlled thermal conditions with intensive feeding. Yields have been the equivalent of 800,000 to 3 million lb/acre/year in contrast to the 20 lb/acre/year of conventional hunting methods on U.S. coastal waters. In shrimp aquaculture, the Japanese reported a winter weight gain seven times that of shrimp cultured in ponds with no temperature control. Oyster farming on a commercial scale in Northport, L.I. uses coolant water from the adjacent utility plant. Intake water at an annual temperature range between 40° and 70° F. is warmed by heated effluent an additional 12° to 18° F. and discharged into a 7-acre lagoon at 150,000 g.p.m. This warmed water reduces the growing period of baby oysters by half. In another project catfish are cultured in effluent from the power plant at Lake Colorado City, Tex. Caged catfish are bathed in 70°-75° F. discharge water in the winter. Yields are equivalent to 100 tons/acre/year with intensive feeding. Other projects in the author's survey include: catfish culture by the Tennessee Valley Authority; oyster culture in Humboldt Bay; lobster

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9.16 DEVELOPMENT OF THE CAGE CULTURE METHOD OF FISH PRODUCTION FOR COMMERCIAL USE IN LARGE RESERVOIR LAKES

Collins, Richard A. (State College of Arkansas, Conway, AR 72032)
Arkansas Game and Fish Commission, Little Rock, Ark., Report, 13 pp. (Aug. 1971)
Available from the National Technical Information Service, U.S. Department of Commerce, Springfield, VA 22151. Order No. COM-72-10056.
NOAA Publications Announcement No. 72-5, Item 72-05-16-05, 5 (Feb. 1972)

Four different cage designs ranging in volume from 3 to 12 cubic yards were each stocked with 300 fingerling catfish per cubic yard to determine the effects of the different cage sizes on growth and conversion of the fish. Fingerlings were graded to a uniform size before being stocked in an attempt to eliminate the differential growth. Results indicate that in large reservoir lakes the cage size can be unlimited in surface area and as deep as the water containing adequate dissolved oxygen. The depth of the cages had no important bearing on the growth rate, and in the cages with the greater surface area the catfish grew more rapidly and converted food better. It was concluded that differential growth of catfish in cages is a result of initial variance of the fingerling fish and not to hierarchy. Large numbers of wild fish around the cages caused problems of loss of food and possibly introduction of diseases. The wild fish can, however, be effectively trapped in the area of the cages. The economic evaluation indicates the following situations: (1) a small-scale operation incorporated into an existing business such as a marina, and (2) a very large-scale operation (200,000 or more fish). (Author)

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9.16 (9.14) COLLECTED REPRINTS OF TUNGKANG MARINE LABORATORY, TAIWAN FISHERIES RESEARCH INSTITUTE, VOL. 1

Liao, I. C. (Tungkang Marine Laboratory, Taiwan Fisheries Research Institute, Tungkang, Taiwan)
Collected Reprints Vol. 1, 207 pp. (1969-1971) Tungkang Marine Laboratory, Tungkang, Pingtung, Taiwan 916.

Seventeen papers initially published in other publications were assembled in one volume to make known the research activities of the laboratory. Most of the papers describe prawn culture as follows: artificial propagation; reproduction; feeds and feeding methods; and protein utilization. The information generated by this research was responsible for the mass production of Penaeus japonicus fingerlings for distribution to fish farmers who culture prawn in Taiwan.

Other papers in the collection relate to artificial propagation and induced breeding of grey mullet, Mugil cephalus Linnaeus. A more reliable source of mature spawners is now available for fish farmers of grey mullet on the island. There is also a note on the adult milkfish Chanos chanos with regard to egg production related to gonad weight. SW

9.13 (0.35) BIOSYNTHESIS OF SQUALENE AND CHOLESTEROL IN THE FISH. I. IN VITRO STUDIES ON ACETATE INCORPORATION

Kayama, Mitsu, S. Zafar W. Rizvi, and Suezo Asakawa (Fac. Fish. Anim. Husb., Hiroshima Univ., Fukuyama, Japan)
Chemical Abstracts 76, No. 5, 23233m (Jan. 31, 1972)

9.19 THERMAL DISCHARGES: ECOLOGICAL EFFECTS

Levin, Arthur A., Thomas J. Birch, Robert E. Hillman, and Gilbert E. Raines (Battelle Memorial Institute, Columbus Laboratories, Columbus, OH 43201)
Environmental Science & Technology 6, No. 3, 224-230 (Mar. 1972)

Because of public interest in possible environmental damage caused by warm water discharges from electric power plants into local bodies of water, the authors reviewed recent and ongoing studies on this subject. No major damage in the aquatic environment is indicated. Conditions at several locations were reported. At the Chalk Point fossil-fueled steam generating installation on the Patuxent River, Md., there was an increase in production of fauna in the warm effluent canal during the warmest months, but a decline in the number of species was cited; at the Connecticut Yankee plant on the Connecticut River, continuing studies indicate no drastic ecological change. However, the possibility of sublethal effects are suggested by 20% weight loss of white and brown bullhead catfishes living in the warm effluent canal; reports on Turkey Point in Biscayne Bay, Fla., indicate heated effluents from the plant have reduced the diversity and abundance of algae and animals. Although mollusks and crustaceans increased somewhat, reports on the Martins Creek plant on the Delaware River, Pa., showed that heated waters attracted fish and enabled them to actively feed during the colder months. The authors estimate a doubling of total heat discharged to condenser cooling from 1967 to 1980. As more steam-electric plants become operative they suggest the necessity of improving the ability to predict response of affected ecosystems; in addition, they recommend evaluating the assimilative capacity of natural waters adjacent to the prospective plant site before proceed-

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9.16 CULTURING TROUT IN CAGES

Collins, Richard A. (State College of Arkansas, Conway, AR 72032)
Arkansas Game and Fish Commission, Little Rock, Ark., Report 12 pp. (Sept. 1971)
Available from the National Technical Information Service, U.S. Department of Commerce, Springfield, VA 22151. Order No. COM-72-10055.
NOAA Publications Announcement No. 72-5, Item 72-05-16-04, 5 (Feb. 1972)

The major objectives were to determine (1) the feasibility of culturing rainbow trout in cages from fingerlings to edible size during the cooler months of the year in warm-water lakes, (2) the proper stocking density in the cages, and (3) the economic feasibility of culturing trout in cages. Triplicate tests were made using cages stocked with 400, 600, and 700 rainbow trout fingerlings averaging 59 g. each. After 115 growing days with 6 day/week feeding, the average weight of fishes in all cages was 163 g. One cage of selected fish were fed for an additional 34 days. These fish attained an average weight of 261 g. Food conversion during the majority of the experiment was 1.54. No significant reduction in feed consumption or growth was noted when water temperatures dropped to as low as 3.5° C; however, temperatures of 2° C or lower produced a noticeable lag in feed consumption and growth rate. The cages with the highest stocking densities showed no reduction in rate of growth or feed conversion over the cages with lesser stocking densities. Economic considerations indicate favorable profit potential in some situations for the culture of trout in cages during the winter in warm-water lakes. (Author)
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9.16

culture in California and Maine; shrimp culture in Florida. The English cultured sole at a site near a power plant in Scotland. Fish growth from egg to 1½-lb. size was attained, with supplemental feeding, in less than 2 years: more than double the growth in nature. The author discusses the growth rate of shrimp in the Gulf of Mexico. In nature, growth of shrimp ceases during the winter months; under aquaculture conditions growth continues. Thus two generations could be grown, doubling the weight per year harvested. A design concept based on this growth cycle is described by the author for frequent, periodic harvesting of shrimp. Aspects of costs, marketing, and economics of the design are discussed. Federal, State, and local laws and regulations are additional factors affecting commercial aquaculture projects. [3 figures, 4 illustrations, 4 references] SW

9.16 THE BASICS OF BREEDING AND FINGERLING PRODUCTION OF CHANNEL CATFISH

Walker, Bobby T. (Louisiana Wildlife and Fisheries Commission)
American Fish Farmer & World Aquaculture News 3, No. 5, 4-7 (Apr. 1972)

The author discusses several techniques in the culture of catfish fingerlings. Subject areas considered are: selection of brood stock, the sequence of events during the spawning process, the importance of quality of the water, and the receptacles used by the catfish for spawning. [5 illustrations] FTP

9.19

ing with construction. Many factors contribute to this capacity in relation to variations in output of waste heat; therefore, a site should be chosen with the advice of competent ecologists. Baseline ecological studies should begin as soon as a site is selected. Ecological information prior to plant construction and operation will then be available to assist in indicating the changes if any that result from plant operation.
[4 illustrations, 1 table, 4 references] SW

9.16 FLOATING FISH GROWING TANK

U.S. Patent 3,653,358 (Apr. 4, 1972)
Fremont, Howard J. (New York, N.Y.); assignor to Marine Protein Corp., New York, N.Y. (pat.)

A segmented chain of large floats support a large fish-growing tank. The tank consists of a flexible liner surrounded by a protective metal or nylon mesh. FTP

9.16 MOLLUSC CLIP

Marcus, Douglas Larry, and Clifford L. Sayre, Jr. (Silver Spring, MD 20902) (pat.)
U.S. Patent 3,656,458 (Apr. 18, 1972)

The clip secures clutch material in the culture of molluscs. SW

9.19 MOBILIZATION OF MERCURIC SULFIDE FROM SEDIMENT INTO FISH UNDER AEROBIC CONDITIONS

Gillespie, D. C., and D. P. Scott (Fisheries Research Board of Canada, Freshwater Institute, Winnipeg, Manitoba, Canada)
Journal of the Fisheries Research Board of Canada 28, No. 11, 1807-1808 (Nov. 1971)

Experiments were performed to determine whether aeration increased the transfer of mercuric sulfide in sediment to water with subsequent pickup by fish. The apparatus used in the experiments consisted of a 40-liter aquarium, a heater, and a fan. Three tanks were used. A material to be used as a sediment with a low mercury content (0.24 p.p.m.) was divided into three 250-g. portions. The mercury content of one portion was increased to 50 p.p.m. with the addition of mercuric chloride; mercuric sulfide was used to augment a second portion to 50 p.p.m.; the third portion remained as is for control. Each portion was added to a tank to form a bed 5 mm. deep which provided for complete oxygen penetration. The tanks were filled with tap water and allowed to stand for 1 week: 50 guppies were then added to each. At sampling times five fish were removed from each tank and analyzed by atomic absorption spectrophotometry. After 60 days an insignificant amount of mercury from the sediments was found in the fish.
[2 figures, 4 references] SW

9.19 POLYCHLORINATED BYPHENYLS AND DDT ALTER SPECIES COMPOSITION IN MIXED CULTURES OF ALGAE

Mosser, Jerry L., Nicholas S. Fisher, and Charles F. Wurstur (Marine Sciences Research Center, State University of New York, Stony Brook NY 11790)
Science 176, No. 4034, 533-535 (May 5, 1972)

The effects of chlorinated hydrocarbons on photosynthetic algae, the base of aquatic food webs, have not been extensively studied. The hypothesis has been advanced that the species composition of phytoplankton communities could be altered because (1) the chlorinated hydrocarbon DDT and polychlorinated biphenyls (PCB) are widespread pollutants; (2) they are selectively toxic to sensitive algal species. To test this hypothesis two phytoplankton species were selected on the basis of their response to DDT and PCBs: the diatom Thalassiosira pseudonana (inhibited growth) and the green alga Dunaliella tertiolecta (growth not affected).

Pure cultures of each organism and a 1:1 mixture of both were prepared. All cultures contained 10^4 growing cells per milliliter at zero time verified by cell count techniques. Cultures were treated with PCBs and DDT; growth as cell count was determined in 4 days.

The growth of T. pseudonana was inhibited by 25 p.p.b. of PCBs but not at 10 p.p.b. or less. Growth was significantly inhibited by 100 p.p.b. of DDT and slightly at 50 p.p.b. No inhibition occurred at 25 p.p.b. or less. The growth of D. tertiolecta was not affected at any of the concentrations of PCBs or DDT tested.

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9.19 EUTROPHICATION OF LAKE 227, EXPERIMENTAL LAKES AREA, NORTHWESTERN ONTARIO, BY ADDITION OF PHOSPHATE AND NITRATE

Schindler, D. W., F. A. J. Armstrong, S. K. Holmgren, and G. J. Brunskill (Fisheries Research Board of Canada Freshwater Institute, Winnipeg, Manitoba)
Journal of the Fisheries Research Board of Canada 28, No. 11, 1763-1782 (Nov. 1971)

A lake that is eutrophic is rich in dissolved nutrients, frequently shallow and with seasonal oxygen deficiency in the lower, cooler, stagnant layers of water. [Eutrophication is the process of becoming more eutrophic either as a natural phase in the maturation of a lake or artificially as by fertilization.] A lake may deteriorate due to excessive growth of phytoplankton induced by eutrophication. Contribution of nutrients from a fully developed agricultural and industrial society may accelerate the process of eutrophication.

The relationship of phosphorus and nitrogen containing compounds and eutrophication was examined. The addition of phosphate and nitrate to a small unproductive lake caused a severalfold increase in growth of phytoplankton. Most of the phosphorus and nitrogen was taken up by the phytoplankton. Phosphorus is the primary limiting nutrient in phytoplankton production. SW
[26 figures, 3 tables, 74 references]

9.19 (0.30) CHLORINATED HYDROCARBON RESIDUES IN AIRBORNE FALLOUT

Södergren, A. (Department of Animal Ecology, Ecology Building, University of Lund, S-223 62 Lund, Sweden)
Nature 236, No. 5347, 395-397 (Apr. 21, 1972)

Airborne particles were retained on a 200 µm. nylon net impregnated with a thin film of silicone oil (SE 30). These nets were exposed in open places for 2 to 3 months at eight locations in southern Sweden. The nets were then treated in Soxhlet extractors with n-hexane for 48 hr. An extract of the n-hexane solution was prepared and injected on a gas chromatograph with electron detectors. The relative retention times were compared to the retention times of known substances. The identity of the more important peaks in the chromatograms were confirmed by chemical methods to be DDT and PCB.

Southern Sweden is subject to airborne material originating from industries along the west coast, the Copenhagen area, and heavily industrialized areas in West Germany. Five of the nets were located in agricultural districts, and two in cities, one of which was next to a municipal garbage incinerator. The average monthly levels in ng/m^2 of DDT and PCB trapped in the nets during the months of January, February and March 1971 show significant differences in regional distribution. A net situated in an agricultural district contained more PCB than the net located outside the incinerator. The evidence indicates that there is a general occurrence of PCB compounds in airborne fallout which increases in periods of high mean rainfall. Correlated with the prevailing winds, part of the PCB fallout may have originated outside the study area. No distinct distribution pattern

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9.2 A MODEL FOR OPTIMAL SALMON MANAGEMENT

Booth, Douglas E. (Fisheries Research Institute, 260 Fisheries Center, University of Washington, Seattle, WA 98195)
Fishery Bulletin 70, No. 2, 497-506 (Apr. 1972)

Considerable attention has been given in the literature recently to continuous time dynamic maximizing models for fisheries in general, but the time discreteness and interdependency problems encountered in the case of most salmon fisheries have been largely ignored. Hence, a discrete time profit maximizing model for a salmon fishery is developed in this paper, and it is shown that a correct salmon management policy takes the form of an investment decision with respect to the level of escapement and that a management policy of maximum sustained yield may be incorrect from an economic standpoint. It is hoped that continued research including construction of a working model will provide some indication of the difference between the magnitude of spawner stocks selected on the basis of maximum sustained yield and stocks selected on the basis of economic optimality. [1 figure, 4 references] Author's abstract

9.19 (0.30)

was found for DDT. Use of DDT for agriculture and gardening has been prohibited since 1970; however, it was found in various locations. This compound is already in the soil and may be making slow long-term contributions to the atmosphere, or it may have drifted in to the study area on prevailing winds.
[1 figure, 1 table, 7 references] SW

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after 9 months. [4 tables, 7 references]

that equilibrium of zinc between particulate matter and water had not been reached consisted of phytoplankton and detritus.) This difference indicates

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In mixed cultures without PCBs or DDT, growth of T. pseudonana was eight- to ninefold greater than D. tertiolecta. In mixed cultures treated with PCBs or DDT growth of T. pseudonana significantly diminished and D. tertiolecta increased at all concentrations tested. In contrast, pure cultures of T. pseudonana were not affected by the lowest concentrations (1 and 10 p.p.b.) of PCBs or DDT tested. Species ratios were substantially changed in the treated mixed cultures, but total cell counts did not significantly differ from the untreated mixed cultures. The biomass remained the same in both.

These results suggest a competition for limited nutrients. As the ability of T. pseudonana to compete for nutrients was impaired by PCBs or DDT, more of the nutrients became available to D. tertiolecta. Natural algal communities could be altered in the same manner in a eutrophic environment. Suppression of growth of sensitive organisms would cause an increase in the bloom of resistant algae and ultimate deterioration of the ecosystem. Such pollutants may also suppress growth of phytoplankton species which are specific food for zooplankters. Thus animal populations higher in the food web would be adversely affected.

In addition, these results suggest that evaluation of pollutants in mixed cultures probably gives a more precise indication of algal sensitivity than in pure culture. [1 figure, 14 references]

SW

9.2 LIVING SYSTEMS: THE ORGANIZATION

Miller, James G. (Department of Psychiatry and Behavioral Sciences, The Johns Hopkins University School of Medicine, Baltimore, MD 21205)
Behavioral Science 17, No. 1, 1-182 (Jan. 1972) (Mental Health Research Institute, University of Michigan, Ann Arbor, MI 48104)

This dissertation is an analysis in terms of the general systems behavior theory of present knowledge concerning one level of living system--the organization. [An exposition of the basic concepts of theory of living systems is presented in "Living Systems: Basic Concepts," Behavioral Science 10, 193-237 (1965).] The present article was written for the intelligent layman rather than for the specialist. [23 figures, 402 references] PJH

9.2 (9.16) ECONOMIC PROFILE OF THE FISH HATCHERY AND BAIT DEALER INDUSTRY IN WISCONSIN

Bradley, Edward, and Sydney Staniforth
Research Report, 32 pp. (Sept. 1971) University of Wisconsin, Department of Agricultural Economics, Madison, WS 53706. Available from the National Technical Information Service, U.S. Department of Commerce, Springfield, VA 22151. Order No. COM-72-10081.
NOAA Publications Announcement No. 72-5, Item 72-05-16-06, 5 (Feb. 1972)

There were 181 private fish hatcheries and 1,364 private bait dealers licensed in Wisconsin in 1968 representing a capital investment of $14,421,000 and total sales of $2,720,259. Suggested areas of expansion were production of warmwater game fish and trout eggs. Substantial losses are caused by minnow mortality in captivity. (Author)
Reprinted

9.2 THE NEW ECONOMIC POLICY AND UNITED STATES INTERNATIONAL OBLIGATIONS

Jackson, John H. (University of Michigan)
American Journal of International Law 66, No. 1, 110-118 (Jan. 1972)

This article is a discussion of the relationship of three measures contained in the New Economic Policy to the United States international obligations under GATT and the IMF. The measures considered are (1) the imposition of a 10% tariff surcharge on most imports, (2) the suspension of U.S. willingness to buy and sell gold for dollars, and (3) a proposed statute which would provide a credit against income tax for a percentage of capital machinery purchases of companies, provided that the goods purchased were produced in the United States.
[14 footnotes] FTP

9.19 THE MICROBIAL DEGRADATION OF PHENYLALKANES. 2-PHENYLBUTANE, 3-PHENYLPENTANE, 3-PHENYLDODECANE AND 4-PHENYLHEPTANE

Baggi, G., D. Catelani, E. Galli, and V. Treccani (Institute of Agrarian and Technical Microbiology, University of Milan, 20133 Milan, Italy)
Biochemical Journal 126, No. 5, 1091-1097 (Mar. 1972)

These compounds and their analogs are of interest because they are used as solvents and components of some synthetic detergents and herbicides and may be found as pollutants.

Two Pseudomonas strains were isolated that are capable of using 2-phenylbutane, 3-phenylpentane, and 4-phenylheptane as the sole source of carbon and energy. Two Nocardia strains capable of using only 3-phenyldodecane as the sole source of carbon and energy were isolated.
[1 figure, 2 tables, 27 references] SW

9.19 DISTRIBUTION OF RADIOACTIVE AND STABLE ZINC IN AN EXPERIMENTAL MARINE ECOSYSTEM

Cross, Ford A., James N. Wilis, and John P. Baptist (Atlantic Coastal Fisheries Center, National Marine Fisheries Service, NOAA, Beaufort, NC 28516)
Journal of the Fisheries Research Board of Canada 28, No. 11, 1783-1788 (Nov. 1971)

One millicurie of a radioisotope of zinc (^{65}Zn) was added to a 9-month old, 2,000 liter, sea-water community of planktonic and benthic algae in a fiberglass tank. After the ecosystem remained undisturbed for 9 months, measurements for differences in ^{65}Zn specific activities were made in the following: water passed through a 0.45-μ filter; similar filtered water reacted with dithizone; similar filtered water reacted with acid prior to dithizone treatment; and dialyzable Zn. No significant differences of specific activity were found in water after these treatments. Specific activity of ^{65}Zn was significantly less in particulate matter retained by a 0.45-μ filter than in the filtered water. (The particulate matter consisted of phytoplankton and detritus.) This difference indicates

9.2 OVER-FISHING: THE ECONOMIC AND TECHNICAL EFFECTS

Anonymous
Motor Ship 52, No. 620, 543-547 (Mar. 1972)

Awareness of the fact that some fisheries are being exploited up to and even past their limit is having impact on industry's ordering of fishing vessels, on the design of these vessels, and on ideas of how much these vessels should cost. The fishing vessels of various European countries are discussed under the following headings: "The 'Vostok' in service too late," "Record catches by U.K. trawlers," "A 50-mile territorial limit for Iceland," "New generation of German trawlers," "Standard Norwegian designs" [stern trawlers], "Success of new U.K. wet-fish trawlers," "New factory trawlers from Brooke Marine," "Large French expansion programme," "Danish trawlers for Greenland," and "Japanese 'supertrawlers' for pollack fishing." [9 illustrations] FTP

9.3 INTERNATIONAL LAW AND THE PROTECTION OF THE OCEANS
(9.19) FROM POLLUTION

Teclaff, Ludwik A. (Fordham University, 140 W. 62nd St., Lincoln Center, New York, NY 10023)
Fordham Law Review 40, No. 3, 529-564 (Mar. 1972)

Because marine pollution has only recently been recognized as a problem of global dimensions and extreme complexity, international law has not yet evolved specific rules for dealing with it. Prohibition of pollution must be sought in the general rules pertaining to the use of the sea. By necessity, these rules are vague and they can be made workable only by interpreting them as almost totally permitting or totally forbidding pollution. Once it is accepted that the duty not to pollute the high seas exists in international law, transgression of this duty must involve the responsibility of states and private enterprise. [175 footnotes] FTP

9.3 SYMPOSIUM LAW AND TECHNOLOGY

[Various authors and titles listed below]
Southern California Law Review 45, No. 2, i-xi and 397-614 (Spring 1972)

This report of the Symposium Law and Technology contains the Editors Note, a Preface by William O. Douglas (Associate Justice, U.S. Supreme Court), and Introduction by John G. Burke (College of Letters and Science, University of California, University Park, Los Angeles, CA 90007), and five articles as follows:

"The Federal Power to Protect the Environment: Available Devices to Compel or Induce Desired Conduct," by Albert J. Rosenthal (Columbia Law School), pp. 397-449. In this article, the author examines various ways in which the Federal government can compel or induce compliance with environmental standards. The sections of the article consist of "Introduction: The Constitutional Power of the Federal Government," "Direct Regulation," "Subsidies, Incentives and Charges," "Use of the Purchasing Power of the Federal Government," "A Word on Private Litigation," "International Actions," and "Conclusion." [236 footnotes]

"Should Trees Have Standing? -- Toward Legal Rights for Natural Objects," by Christopher D. Stone (University of Southern California), pp. 450-501. The author proposes (seriously) that we give legal rights to forests, oceans, rivers, and other so-called "natural objects" in the environment--to the natural environment as a whole. [138 footnotes]

"Environmental Regulation of Power Plant Siting: Existing and Proposed Institutions," by A. Dan Tarlock (Indiana University, Bloomington, Indiana), Roger Tippy, Frances Enseki Francis, pp. 502-569. The authors analyze the legal methods

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9.3 METHODS TO EXPEDITE ENVIRONMENT PROTECTION:
(9.19) INTERNATIONAL ECOSTANDARDS

Contini, Paolo, and Peter H. Sand (Food and Agriculture Organization of the United Nations, Rome, Italy)
American Journal of International Law 66, No. 1, 37-59 (Jan. 1972)

One distinctive element of most contemporary action plans for international protection of the environment is the call for common international standards by which environmental degradation is to be monitored and controlled. "Alternatives" to traditional treaty making for the purposes of environmental protection do exist in contemporary international law. In fact, many states already participate in international standard setting for a variety of subjects, many of which are within the scope of "environmental management." The authors believe that the accumulated experience described in their article should serve as a guide in devising effective and flexible means to establish and preserve tolerable international standards. [128 footnotes] FTP

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for compelling regulatory agencies to consider and assess the environmental impact of the future power source development. The sections of the article consist of "Introduction," "Utility Decision-Making," "Environmental Side Effects of Site Selection and Methods of Minimization," "Existing Federal Regulatory Structure," "Local and State Regulation of Plant Siting and Transmission Line Location," "Institutional Reforms," and "Conclusion." [267 footnotes]

"Technology Assessment and Weather Modification," by Jack C. Oppenheimer (Executive Secretary of the President's Air Quality Advisory Board) and W. Henry Lambright (Maxwell School of Citizenship and Public Affairs, Syracuse University, New York), pp. 570-595. This article deals with the rainmaking (including snow-making) aspect of weather modification. The authors first summarize the history of rainmaking, then analyze the roles played by various assessors up to the present. Finally, they offer some observations on lessons of the case of weather modification for the assessment of technology. [44 footnotes]

"The Freedoms and the Control of Science: Notes From the Ivory Tower," by Joshua Lederberg (Stanford University, Calif.), pp. 596-614. The social merits and control of scientific and technological progress are discussed. The sections include "The Profession of Science: Demands for Control and Some Suggested Perspectives," "Popular Pressure and the Control of Technology," "Science, Technology and the Law," and "Expertise." [31 footnotes]

FIP

9.2 YEARBOOK OF FISHERY STATISTICS. FISHERY COMMODITIES 1970

Food and Agricultural Organization of the United Nations, Vol. 31, xix + 320 pp. (Published 1971) Department of Fisheries, FAO 00100 Rome, Italy.

This issue brings together the 1970 statistical data relating to production and international trade in fishery commodities. The information is divided into the following major subjects:

Summaries: Fish, Fresh, Chilled or Frozen; Fish, Dried, Salted or Smoked; Crustaceans and Molluscs, Fresh, Frozen, Dried, Salted, Etc., Fish Products and Preparations, Whether or Not in Airtight Containers; Crustacean and Mollusc Products and Preparations, Whether or Not in Airtight Containers; Oil and Fats, Crude or Refined, of Aquatic Animal Origin; and Meals, Solubles and Similar Animal Feedstuffs, of Aquatic Animal Origin.

Copies may be purchased from the sales agents and booksellers for FAO publications or from the Distribution and Sales Section, FAO, 00100 Rome, Italy. Price US$9.00, £3.60, FF45.00.

SW

9.11 VERTICAL DISTRIBUTION OF PHOTOSYNTHETIC PIGMENTS AND THE PENETRATION OF LIGHT IN MARINE SEDIMENTS

Fenchel, Tom, and Birthe J. Straarup (Mar. Biol. Lab., Helsingör, Denmark) Chemical Abstracts 76, No. 9, 44100f (Feb. 28, 1972)

9.3 (9.19) WATER POLLUTION AND THE FUTURE LAW OF THE SEA

Petaccio, Victor (Political Science Department, Temple University, Philadelphia, PA 19122) International and Comparative Law Quarterly 21, Part 1, 15-42 (Jan. 1972)

The draft United Nations Sea-Bed Proposal sets forth the generalized model for licensing, monitoring, policing, and administering the high seas. The author discusses an alternative proposal that begins a notch lower in the political spectrum and that involves a new hybrid form of regional seabed regimes organized by regions would provide the working experience and psychological reassurances required to accept control by the International Seabed Resources Authority. [6 footnotes, appendix]

FTP

9.3 (9.19) POLLUTION OF THE SEA AND INTERNATIONAL LAW: A CANADIAN PERSPECTIVE

Gold, Edgar (Dalhousie Law School, Dalhousie University, Halifax, Nova Scotia, Canada) Journal of Maritime Law and Commerce 3, No. 1, 13-44 (Oct. 1971)

The author concludes that sea pollution will increase in the future despite the unilateral and international efforts described in this report due to (1) the rapidly increasing tanker fleet, (2) the rapidly increasing size of tankships, and (3) the ever-increasing demand for oil throughout the world. Only massive and urgent international action, on an unprecedented scale, can alleviate the steadily deteriorating situation, and such action must take place at the highest qualified international level. The stake is nothing less than the quality of life itself. [184 footnotes]

FTP

9.6 HUMAN ENVIRONMENT JOURNAL

Anonymous Chemistry and Industry No. 4, 135 (Feb. 19, 1972)

The Royal Swedish Academy of Sciences is publishing the [journal "Ambio," which will appear bimonthly and will be published in English. The journal will contain articles on the interrelated fields of technology, environment, and management of the natural sciences. Annual subscription is $13.00 and subscriptions should be sent to Universitetsforlaget, P.O. Box 307, Blindern, Oslo 3, Norway.

FTP

9.3 (9.17) COMPILATION OF FEDERAL LAWS RELATING TO CONSERVATION AND DEVELOPMENT OF OUR NATION'S FISH AND WILDLIFE RESOURCES, ENVIRONMENTAL QUALITY, AND OCEANOGRAPHY

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This compilation was prepared at the request of the Hon. Warren G. Magnuson, Chairman, for the use of the Committee on Commerce, United States Senate (92d Congress, 2d Session). It contains the public laws relating to fish, wildlife, oceanography, and environmental quality and is intended to provide the reader with all the laws in force at one particular point in time.

FTP

9.125 COLOR CHANGE IN FISH

Bereiter-Hahn, Juergen (Switzerland) Chemical Abstracts 76, No. 9, 44122q (Feb. 28, 1972)

2.3 APPARATUS FOR PACKAGING FISH AND VARIOUS OTHER PRODUCTS

Pitters Proprietary Ltd. (Australia) (pat.)
British Patent 1,249,389
BFMIRA Abstracts 24, No. 12, Abstract No. 4172, 848 (Dec. 1971)

Apparatus for filling fish fingers into open-ended rectangular or square cartons is described. The equipment positions the product in the carton by means of a pushing action. Reprinted

3.19 (3.63) MEAT AND FISH PRESERVATION

EEFP Corp. (pat.)
British Patent 1,253,318
Food Technology 26, No. 4, 168 (Apr. 1972)

Fish or meat are treated, alternately, to pressurized steam and to vacuum to extract the loose fluids from the uncooked meat. FTP

3.12 FISH PRESERVATIVE

PROGIL (France) (pat.)
British Patent 1,255,205
BFMIRA Abstracts 25, No. 2, Abstract No. 631, 127 (Feb. 1972)

A mixture of benzoic and propionic acids and their alkali metal salts buffered to pH 7.0 is incorporated into the ice used for freezing fish on board the fishing vessels. The concentration of preservative in the ice was about 2 g/litre of the water. (Abstractor's note: this is not permitted in the United Kingdom.) Reprinted

3.12 BOTULINUM EXOTOXIN INHIBITED FOODS

Hass, G. J., N. Insalata (pat.)
U.S. Patent 3,607,311
Food Technology 26, No. 1, 84 (January 1972)

Small amounts of everninomicin is added to food. FTP

6.37 TANGLE ADDITIVE

Okano Food Ind. Co. Ltd. (pat.)
Japanese Patent 32782/71
Food Technology 26, No. 4, 178 (Apr. 1972)

The quality of bread is improved by the incorporation of powdered tangle. FTP

6.86 TECHNOLOGICAL IMPROVEMENT IN THE TREATMENT OF CASPIAN SEAL SKINS

Magomaev, A. A. (Dagest. Gos. Univ. im. Lenina, Makhachkala, U.S.S.R.)
Chemical Abstracts 76, No. 10, 47399w (Mar. 6, 1972)

3.12 FISH PRESERVATION

Ueno Seiyaku Oyo Kenkyosho KK (pat.)
Japanese Patent 34736/71
Food Technology 26, No. 4, 168, 170 (Apr. 1972)

Alkali, or ammonium salts of gluconic acid, is added to minced fish meat and the product is then frozen. FTP

3.17 FISH PRESERVATION

Sakamoto, N. (pat.)
Japanese Patent 38542/71
Food Technology 26, No. 4, 170 (Apr. 1972)

Zeolite or silicate clays are incorporated into the ice used for storing fresh fish and shellfish. FTP

3.5 LACTIC ACID IN BEEF JERKY

Berberian, Antoine (Brazil)
Chemical Abstracts 76, No. 5, 23889e (Jan. 31, 1972)

6.54 FISH SOUP

Konser Vipapi Troszt (pat.)
German Patent 1,943,414
Food Technology 26, No. 4, 168 (Apr. 1972)

This product is a Hungarian fish soup containing fish-meat broth, ground red paprika, onion powder, salt, flavoring materials, fat, and sodium glutamate. FTP

6.54 CHEWING GUM WITH FREEZE-DRIED FOOD PARTICLES

Echeandia, James F., and Robert M. Lehman (Richmond, Va.); assignors to Philip Morris Inc., Richmond, Va. (pat.)
U.S. Patent 3,632,358
Official Gazette of the U.S. Patent Office 894, No. 1, 277 (Jan. 4, 1972)

The chewing gum contains particles of freeze-dried food which are small in size but large enough to be visible. FTP

6.54 FISH ROE PRODUCTS

Nichiro Fisheries Co. Ltd. (pat.)
Japanese Patent 34734/71
Food Technology 26, No. 4, 168 (Apr. 1972)

Immature herring roe are first soaked in a solution of a carboxylic or inorganic acid, then they are soaked in a solution containing an aluminum salt. The product is then sprinkled with salt. FTP

2.3 OYSTER OPENING MACHINE

Lanier, Leo H. (710 South Bay Street, Amite, LA 70422) (pat.)
U.S. Patent 3,654,666 (Apr. 11, 1972)

An oyster-opening machine which uses pneumatic power to actuate an anvil and bit to mechanically separate the shells is described. SW

2.3 AUTOMATIC SHRIMP SHELLING MACHINE

Anonymous
Fd Trade Rev. 41, No. 9, 47 (1971)
BFMIRA Abstracts 25, No. 2, Abstract No. 595, 121 (Feb. 1972)

A Dutch machine, claimed to shell 3600 shrimps per hour, is reported. The keeping qualities of the mechanically-shelled shrimps are said to be considerably better than those of hand-shelled shrimps. D.B. Reprinted

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2.0 GREENING OF CANNED SHELLFISH. V. SEASONAL VARIATION AND CORRELATION WITH THE METAL CONTENT OF THE GREEN PIGMENT CONTENT OF OYSTERS (3.334)

Osada, Hiromitsu (Toyo Junior Coll. Food Technol., Kawanishi, Japan)
Chemical Abstracts 76, No. 5, 23885a (Jan. 31, 1972)

3.336 CANNED FISH PRESERVATION

Osakabe, I. (pat.)
Japanese Patent 36180/71
Food Technology 26, No. 4, 170 (Apr. 1972)

Amino acids are added to canned fish to inhibit the formation of struvite. FTP

3.336 FISH SEASONING

Hayashibara KK (pat.)
Japanese Patent 36179/71
Food Technology 26, No. 4, 170 (Apr. 1972)

A seasoning solution containing maltose is used to inhibit the release of CO_2 from canned fish products. FTP

3.336 STRUVITE INHIBITION

Chiyoda Kagakukogyosho KK (pat.)
Japanese Patent 34735/71
Food Technology 26, No. 4, 168 (Apr. 1972)

Calcium lactate (or other calcium salts of organic acids) is added to the fish to be canned. FTP

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Lederberg, Joshua	22	9.3
Lee, J. S.	7	2.9
Lehman, Robert M. (pat.)	24	6.54
Levin, Arthur A.	17	9.19
Liao, I. C.	17	9.16
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Lowry, R. R.	15	9.15
Ludlow, John D.	4	0.9
Ma, Pang F.	11	7.591
Maddrell, S. H. P.	2	0.39
Maga, J. A.	13	8.8
Magomaev, A. A.	23	6.86
Mahnke, Cy W.	13	7.86
Marcus, Douglas Larry (pat.)	18	9.16
Margolis, L.	16	9.15
Matsui, Takamitsu	8	2.146
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McCarraher, D. B.	5	1.0118
McCarthy, I. E.	9	3.6
McDermott, L. A.	15	9.15
Meinke, Wilmon W.	11	6.54
Melville, Joanne M.	2	0.38
Mensinger, Gary C.	6	1.0118
Messenger, J. K. (pat.)	23	3.2349
Meyer, Judith G.	4	0.8
Miller, James G.	20	9.2
Minor, T. E.	3	0.5
Miyake, Masato	1	0.32
Möhler, K.	2	0.4
Mohrman, Robert K. (pat.)	8	3.12
Monnet, Robert	2	0.38
More, Marie T.	2	0.38
More, Pol	2	0.38
Mosser, Jerry L.	19	9.19
Munda, Ivka	10	6.30
Mundt, J. O.	9	3.6
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--	6	2.1121
Nakazono, S. (pat.)	10	3.63
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Niwa, Eiji	1	0.32
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--	9	4.92
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Onishi, T.	12	7.592
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Pappenheimer, A. M., Jr.	1	0.4
Park, J. R.	9	3.6
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Percival, Elizabeth	10	6.32
Petaccio, Victor	22	9.3
Piette, L. H.	1	0.38
--	11	7.591
Pirati, Duilio	10	3.331
Pirazzoli, Pietro	10	3.331
Poisbeau, Jeanne	2	0.38
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Randall, John E.	8	2.9
Rao, N. Appaji	11	7.591
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Scott, D. P.	18	9.19
Shibata, Keishi	8	2.146
Shono, Toshihiko	14	7.8
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Stromont, Clyde J.	1	0.38
Sugiyama, H.	3	0.5
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Thomas, K. L.	13	7.8
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Toyomizu, Masamichi	14	7.8
--	16	9.13
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Uskov, I. A.	14	8.51
Uskova, E. T.	14	8.51
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Utter, Fred M.	1	0.38
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Walters, C. L.	1	0.4
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Weisskopf, Victor F.	6	0.9
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Yee, William C.	17	9.16
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